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The Paris Metropolitan Railway System.

SINCE the opening of the Porte Maillot-Vincennes line in July, 1900, the popularity of underground railways has steadily increased among the inhabitants of the French capital, and much energy has been displayed by those interested in the construction of the various lines of the system authorised in 1897 and subsequent years.

The lines authorised in July, 1897, by the Municipal Council and approved by the Legislature in March, 1898, included the following routes, which are indicated on the accompanying plan by numerals (see plate with this week's issue) :—

(1) Porte Maillot—Vincennes.
(2) Outer Boulevards Circle.
(3) De Courcelles—Menilmontant.
(4) Porte de Clignancourt—Porte d'Orléans.
(5) Gare du Nord—Place d'Italie.
(6) Cours de Vincennes—Place d'Italie.
(7) Place du Danube—Palais-Royal.
(8) Auteuil-Place de l'Opéra.

The last two of these lines at first received only contingent approval, but have since been definitely authorised by the Municipal Council under the powers conferred by the law of 1898. The first three and the fifth lines have been in service for some time past, and the remaining four lines are rapidly nearing completion.

It should be pointed out however, that the positions of the terminal stations of line No. 7 have been altered. One has been established at the Porte du Pré-Saint-Gervais instead of at the Place du Danube. As for the other, the authorities first decided that it should be transferred from the Palais-Royal to the Place du Carrousel, but, owing to the opposition by the architect to the Louvre in 1905, it was finally decided by the Municipal Council that the line should be diverted so as to run beneath the Rue des Pyramides and the Rue des Tuileries to the river side, and prolonged thence to make connexion at the Boulevard Morland station with the inner circle railway, which was authorised last year.

In 1903 the Municipal Council decided in favour of two other lines, which have since been definitely authorised and are now under construction :—

(3*a*) Avenue de Villiers—Porte de Champerret.
(7*a*) Carrefour Louis-Blanc—Porte de la Vilette.

As shown on the plan, line (3*a*) is an extension from the Avenue de Villiers station to the fortifications, placing four additional stations on the Boulevard Malesherbes at the disposal of passengers. Line (7*a*) is a branch of line (7) beneath the Faubourg Saint-Martin and the Rue de Flandre, with five stations beyond the Carrefour Louis-Blanc.

All the foregoing railways belong to the Compagnie du Métropolitain, and to them should be added two others whose construction by the Compagnie Nord-Sud was definitely authorised in April and July, 1905. These lines, now in course of execution, are indicated on the plan by broken lines, and may be described thus :—

Porte de Saint-Ouen—Porte de Versailles.
Place Jules-Joffrin—Gare Saint-Lazare.

On March, 26, 1904, the Municipal Council, after due inquiry, approved the project of the Compagnie du Métropolitain to construct a branch of line No. 2, entitled :—

Trocadéro—Porte de Saint-Cloud.

This line, however, has not yet been authorised by the Legislature.

On December 23, 1907, the Municipal Council approved the construction of various other lines subject to confirmation by the Legislature. The lines in question were placed in two categories; the first including those which should be commenced without delay, and the second those which the Council considered might be constructed eventually.

The first list comprises the following :—

(*a*) Extension of No. 7 from the Avenue de l'Opéra to the Boulevard Morland.
(*b*) Extension of No. 3 from the Place Gambetta (Menilmontant) to the Porte des Lilas, thence connecting with No. 7 near the Porte du Pré-Saint-Gervais.
(*c*) Extension of No. 4 from the Porte d'Orléans to the Porte de Gentilly.
(*d*) Extension of the Trocadero-Porte de Saint-Cloud line to the Opera, and eventually to the end of the Boulevard des Italiens.
(*e*) Branch from the Place de la Bastile to the Porte de Picpus.
(*f*) Inner Circle beneath the Boulevards and the Boulevard Saint-Germain, this line being identical with No. 8 between the Opera and the Invalides.
(*g*) Branch from the Place de la République to the Porte des Lilas.
(*h*) The ends of a line between the Porte de Choisy and the Porte de Montreuil.

The original course of the Inner Circle railway has since been modified, as near Saint-Germain-des-Prés it leaves the boulevard and passes beneath the Rue

du Four, the Rue de Sévres, and the Boulevard des Invalides.

The last line mentioned in the list was at first passed by the Council in its entirety, but owing to objections from the Préfet de la Seine, the middle part of the line was placed in the second category, and the northern end of the Porte de Choisy section was extended to make connexion with No. 4 at the Carrefour de l'Odéon, thus doubling the Inner Circle railway along the Boulevard Saint-Germain.

In the second category were placed the following lines :

(*j*) Branch from Saint-Augustin to the Porte des Ternes.
(*k*) Branch from No. 8 to the Porte de Sévres.
(*l*) Middle section of the Porte de Choisy-Porte de Montreuil line.
(*m*) Branch from No. 2 to the Porte de Pantin.
(*n*) Connexion between Nos. 4 and 8, Pont Mirabeau to Montrouge.

The network of metropolitan railways here briefly described will provide, when completed, most convenient means of communication between all parts of Paris, and those who are familiar with the city will see from our plan that the existing and projected lines follow very much the same routes as those taken by the tramway and omnibus services, whose excellence is generally recognised. In laying down the underground system the utmost care has been taken from the beginning to comply with the requirements of the travelling public, and not a single line was finally authorised until the Legislature had been satisfied concerning its public utility.

In June, 1901, after the first network of eight lines was settled, and the operation of the Porte Maillot-Vincennes route had shown in unmistakable fashion the readiness of the public to avail themselves of the new means of rapid transport, the Municipal Council invited the administration to prepare a scheme for further lines, taking into account suggestions emanating from various sources and the necessity for arriving at a complete and harmonious system.

In December, 1901, the Préfet de la Seine laid before the Council a supplementary project drawn up by the chief of the technical service of the Metropolitan Railway, M. Bienvenue, Inspecteur-Générale des Ponts et Chausées. This scheme was intended to comply with the following conditions :—

(1) To make good the existing deficiency of traffic facilities, and in particular to provide for the requirements of districts at a distance from the centre of the city.
(2) To serve all parts of the capital by means of underground railways laid out so that a zone of attraction should exist for a width of 400 metres on either side of every line.
(3) To make provision for convenient connexions in the future with a system of suburban railways, such as that suggested as desirable by the Conseil-Général de la Seine.

The proposals put forward by M. Bienvenue contemplated eight additional lines, and may be taken as the forerunner of the additional network of railways approved in 1904 and 1907 by the Municipal Council.

Although the Paris Metropolitan railways are being worked and built by public companies, the cost of construction has been and will be covered chiefly by loans from the Municipal Council. So far only two loans have been made, one of 165 million francs (6,600,000*l.*) in 1898, and the other of 170 million francs (6,800,000*l.*) in 1903. A third loan of 45 million francs (1,800,000*l.*) was voted by the Council in 1906, for the lines approved in 1904 and 1905, but although the Bill providing for this loan has passed the Chamber of Deputies it still awaits sanction by the Senate. These three loans represent a total of 380 million francs (15,200,000*l.*), and provide for all the lines save those approved in principle on December 23, 1907.

For the last series the Compagnie du Métropolitain suggested a loan of 205 million francs (8,200,000*l.*), but, in view of objections raised by the Préfet de la Seine, the Municipal Council felt bound to reduce the amount to 170 million francs (6,800,000*l.*), and we understand that the Administration at present demand a further reduction to 110 million francs (4,400,000*l.*). The ultimate decision of the Legislature on this point will of course affect the number of new lines to be put in hand as the next instalment.

From the foregoing figures it will be seen that the total cost of the railways mentioned in detail and represented on the plan will not be far short of 600 million francs, or, say, 25 millions sterling. That is a large sum, but bearing in mind the numerous stations and the widespreading network of lines we do not think it in any way excessive. With regard to the amount of the new loan, the great thing for consideration is the return to be made to the Municipality and the reasonable probability of such return being maintained. These points are fully discussed by M. Bienvenue in his report of October last, from which we take the following figures.

M. Bienvenue has calculated the probable volume of traffic according to the method hitherto adopted in Paris, and justified by past experience. His estimates are based upon the principles that the attraction for traffic of a metropolitan railway line is exercised upon the zone between two parallels 400 metres apart, and that where two or more lines meet or cross in a given district, the number of passengers on each line must be reduced proportionately. The figures relative to population taken by M. Bienvenue are those given by the census of 1906, and he has compared them for each of the four lines in operation (No. 1, No. 2 Nord, No. 2 Sud, and No. 3) with the traffic returns for the first six months of 1907, obtaining a series of coefficients expressing the ratio between the number of passengers transported and the number of inhabitants along each route. Similar figures have been calculated for the lines under construction and contemplated in the reduced loan of 110 million francs, due attention being given in every case to the character of the district served.

The general result is that for thirteen routes, including projected extensions, M. Bienvenue arrives at a total of 394,428,000 passengers a year from districts with the collective population of 2,053,000 inhabitants. He points out, however, that as these figures are based upon the first half of the year when traffic is relatively small, it would be quite safe to take the total number of passengers at 440 millions annually. As nearly 200 million passengers were carried on the lines open in 1907, this suggested alteration seems to be reasonable. On that basis the revenue is estimated at 23,150,000 francs, or 4,641,000 francs in excess of the amount to be provided yearly for sinking charges and interest to the Municipality. If the larger mileage contemplated by the vote of 170 million francs were taken into account there would, of course, be a greater volume of traffic, and equally satisfactory prospects of interest on the loan and, let us hope, of profit to the shareholders.

While it is far more easy to prepare estimates of this kind than to justify them by actual experience afterwards, the results already attained on the Paris Metropolitan Railways seem sufficient to reassure the Municipal Council and the Legislature as to the wisdom of continuing the policy hitherto adopted. Moreover, it must be borne in mind that on the lapse of thirty-five years after the completion of the last line of each system, the railways will fall one after another into the possession of the Municipality, who will thus ultimately own the most complete and best-planned system of metropolitan railways in the world.

NOTES.

Trade Unions.

FROM the Report of the Chief Registrar of Friendly Societies the figures relating to trade unions are given for the year ending December 31, 1906. At that date 674 unions were upon the register, 645 of which made returns. The total membership of these unions making returns was 1,719,031, an increase of 151,512 on the previous year; their income amounted to 2,709,665*l.*, an increase of 152,485*l.*; their expenditure was 2,283,230*l.*, a decrease of 222,794*l.*, whilst the balance of funds was 5,864,342*l.*, an increase of 414,579*l.* In the year 1875 only 151 unions made returns with a membership of 282,245, an income of 331,205*l.*, the balance of funds being 405,755*l.* The income has increased therefore some 2¼ millions, and the balance some 5¼ millions. These figures are of considerable importance when the political attitude which the unions have only assumed during the past year is regarded. Many of the unions stand pledged to support the Socialistic policy of the Labour party, and a Parliamentary levy is made for this purpose if the majority in each union so decides, a levy which the Courts have decided the unions have powers to make if their rules so provide. Are the trade unions with these immense resources, both in money and in powers of compulsion over their members, to become political unions? That is a question which we venture to think requires very serious consideration.

Roofs in the Recent Gale.

DURING severe wind storms we naturally expect a certain amount of damage to buildings, but the reports which are to hand concerning the effect of last week's gale appear to suggest inadequate provision for wind pressure on the part of architects in various parts of the country, and

notably with regard to roof construction. In the Birmingham district the roof of a large school-house was completely demolished, two churches were partly unroofed, the roof of a factory was blown across the Great Western Railway, and the covering of a football grand-stand was torn off. Similar mishaps occurred to a football stand at Hull, to the Foxhound Show building at Peterborough, to a cotton mill near Stockport, and to other structures throughout the storm area. There is no reason why roofs should not be designed to withstand the effects of wind pressure without being demolished or blown away bodily. The subject is one obviously deserving more adequate consideration in the future.

The Surface Treatment of Concrete.

IN a club-house recently erected at Philadelphia some pleasing results have been attained by employing concrete as an architectural building material, simply relieving large areas by mosaic borders, bands, and cornices formed of coloured tiles instead of hiding the concrete under brick or plaster, or of moulding it in imitation of stone. Almost any colour that can be reproduced in plain or glazed tiles will harmonise with the neutral tint of concrete, and by the judicious insertion of tiles representing friezes, lintels, pilasters, medallions, panels, and other details good effects are readily obtained that will suit many types of design. There is no doubt that reinforced concrete lends itself to exceedingly interesting forms of construction which ought on no account to be cloaked under conventional materials in such a way as to conceal just those features which should be prominently displayed. The building to which we refer in this note is described by Mr. Henry C. Mercer in the *Current Age*, and the illustrations there given appear to justify the method of decorative treatment proposed by the writer — at any rate for some styles of design.

A New Column Formula.

IN a paper read before the American Society of Civil Engineers on "Safe Stresses in Steel Columns," Mr. J. R. Worcester discusses some of the many column formulæ already in use, and leads up to the proposition that in a diagram giving values of permissible compressive stress for different values of $l \div r$, an elliptical curve best complies with experimental data. The formula giving such a curve is of very simple form, viz., $A = B\sqrt{1 - l^2/(Cr)^2}$; where A = the permissible stress, B = the maximum stress for $l \div r = 0$, and C = the maximum value allowed of $l \div r$. A diagram reproduced as an illustration to the paper shows that the curve as plotted occupies an appropriate position among a number of dots indicating results of tests by Tetmajer, Marshall, Christie, Bouscaron, Strobel, Lauza, and the Watertoun Arsenal. Of course there are plenty of other column formulæ that show to equal advantage in diagrams, although the author does not bring this point out.

Applications of Electric Power.

THE papers read to the Institution of Electrical Engineers last week are of interest, as they show that substantial progress is at last being made in the industrial application of electric power. Mr. Henderson discusses mainly the application of electricity to railway goods warehouses, and Mr. Taylor to electric power in docks. They both show that considerable economies can be effected by replacing hydraulic by electric machinery. At the Forth Goods Warehouse, Newcastle, two electric transporters were found ample to do the work of the eleven hydraulic cranes which they replaced. As the cost of the power consumed is very small, and the electric machinery is extremely simple and can stand the roughest usage, the change has been for the better in every way. Every new dock, like Rothesay, Fishguard, etc., is fitted with electric power throughout. In the case of docks already furnished with hydraulic power it is generally advantageous to replace the steam-engines driving the pumps by electric motors. At the Tyne Dock, for instance, three engines and five boilers are being replaced by four three-phase motors of 132-b.h.p. each, which are supplied with current from the public mains. In the Tyne district electric power can be obtained at a very small price, and hence the heavy capital expenditure for a private generating station is saved, and so more money can be spent on the special objects for which the factory is designed. We think that it is for the advantage of manufacturing companies to support power companies, as an increase on the load of the latter would lead to a substantial reduction in the cost of supply. Rapid progress also is now being made in the application of electric driving in textile mills. In 1902 none of them employed electric driving. The horse-power of the motors used for this purpose is now 26,000, and is rapidly increasing. The extended use of electric power promises well for the future of the electric supply industry.

Live Steam Feedwater Heaters.

FOR some years past an impression has been abroad to the effect that it is more economical to heat boiler feedwater by steam taken from the boiler than to utilise exhaust steam for the same purpose. That of course in the nature of things is absurd, except in cases where exhaust steam can be better used in some other way. But, as Professor Goodman and Mr. Maclachlan state in their paper which was read last week to the Institution of Mechanical Engineers, various tests which have been made appear to show that some economy results from the use of live steam heaters, instead of passing cold feedwater into the boiler. The percentage of saving claimed is so small that it might easily be accounted for by variation of the working conditions during the conduct of the tests. Having had an opportunity of inquiring into this point under ideal conditions, the authors found that the boiler examined evaporated almost exactly the same quantity of water per pound of coal both when the heater was in use and when it was not in use, the results being even slightly better when the boiler was working without the heater. Therefore they are forced to the conclusion that the heater has no material effect on the economy of the boiler, although it appears that less deposit occurs when the heater is in use. This paper will serve a useful purpose in helping to expose a fallacy which in many instances has been responsible for unnecessary waste of fuel.

Motor Accidents.

THE figures recently given by the President of the Local Government Board in relation to accidents from the various classes of vehicular traffic certainly do not assist the motorists' cause. Licences in 1907 were paid upon 76,567 private motor-cars and cycles, and licences were paid on 413,000 horse-drawn vehicles, excluding hackney and stage carriages; these figures are apparently for the United Kingdom. No return can be given of accidents in the United Kingdom, but in the Metropolitan Police District 16,010 accidents were reported from motor vehicles and 21,415 from horse-drawn vehicles. Probably the proportion of motor vehicles in the Metropolitan District is greater than elsewhere, and in the returns as to accidents hackney carriages are included; but even then the motor vehicles are not in the same proportion as the accidents, viz., rather more than two-thirds.

The Royal Academy Lecture-Room.

IT is really time that the Royal Academy, which includes various eminent architects, should do something to render what is called the "Lecture Room" (known as the principal sculpture room at the annual exhibitions) more suitable for the comfort of an audience. Officially the lectures are lectures to the students; practically, where the subject is at all of general interest, they are often addressed to a large audience filling the room, as in the case of Viscount Dillon's lecture on ancient armour and the Dean of Gloucester's admirable lecture on the catacombs of Rome. At the commencement of the lectures the close-fitting sliding-doors at each entry are closed, and there does not appear to be any provision whatever for the admission of fresh air into this room full of people. It is a barbarous state of things. Several of the audience left in the middle of the two lectures referred to, moving the heavy doors with difficulty to escape from their prison; we have no doubt from being unable to support the atmosphere of the room any longer. At the annual exhibitions of course all the doorways between rooms are open and there is a certain circulation of air; when the doors are closed there appears to be no provision whatever for ventilation. In the Lecture-Room, at all events, such provision ought to be made, if lectures are to go on there without the audience being half suffocated.

Society of Painter-Etchers.

THE present exhibition of the Royal Society of Painter-Etchers, at the Gallery of the Society of Water-Colours, is more largely occupied than usual with subjects connected with architecture; from the highly worked engravings on copper (rather than etchings) of Mr. Axel Haig, to the free treatment of the elements of the picturesque in buildings which

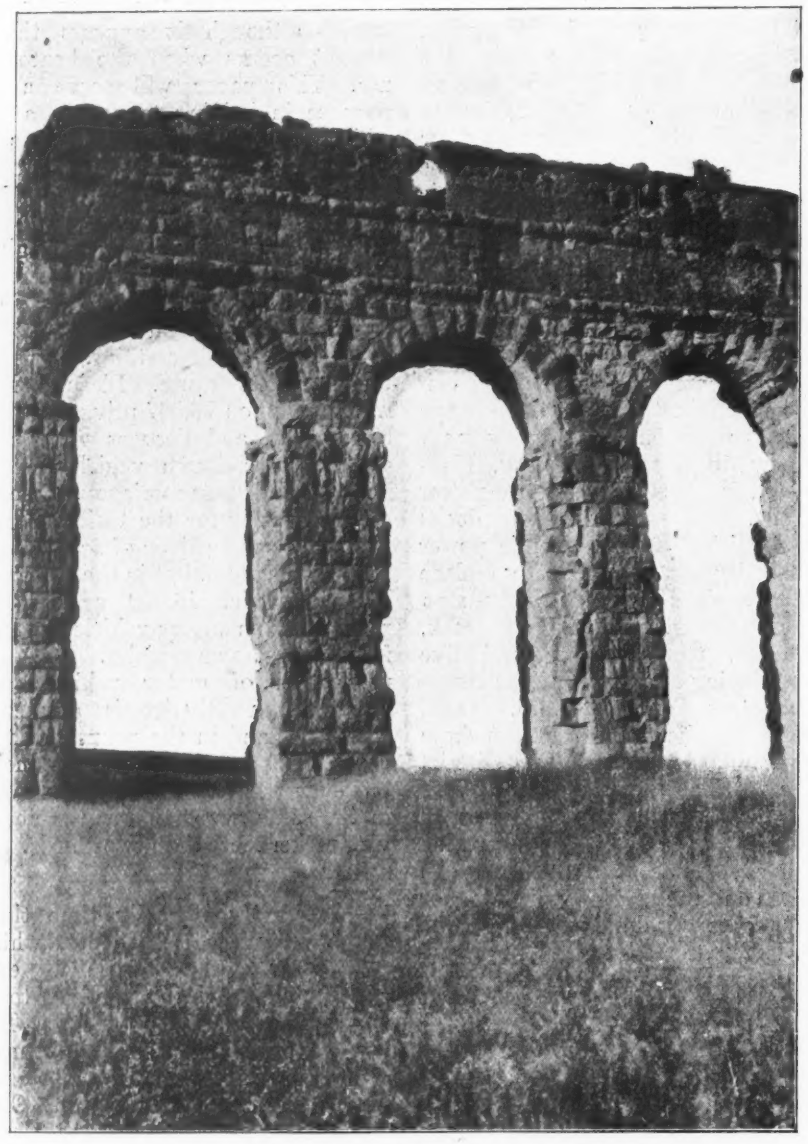

Fig. 23. *Aqua Claudia and Anio Novus: the Highest Arches.*

we see in the slight but thoughtfully executed work of such etchers as M. Bèjot, Mr. Charlton, and others. Mr. Hedley Fitton, who has a reputation as an architectural illustrator, occupies a kind of midway position in etchings of architecture worked up with great power and effect, but with a much more free line than in the carefully engraved style of Mr. Haig's work. But the essential quality of etching is shown in the power to indicate as much as possible with as few lines as possible. See for instance M. Bèjot's remarkable work, "La Seine, Paris" (77); the water and the foreground quay all blank paper, the darks of the distant buildings and the foreground trees detaching themselves from it; the edge of the quay is shown by a single line in the middle distance; even that is discontinued in the foreground, as an actual material line, but the eye sees it all the same. Such an etching is an education in the art of reticence in line drawing. So are Mr. Short's perfect little works, such as "Langston Mill" (35), showing the true spirit of line etching. Among works of similar excellence are Mr. Charlton's "Coal Brigs" (124) and "The Arun" (126), and others by Miss Constance Pott, Mr. Martin Hardie, M. Leheutre, etc. Sir C. Holroyd's more romantic order of work (if one may call it so), in a different class of execution, is finely illustrated in his drawing of Wordsworth's Yews (49)—the "fraternal four of Borrowdale."

We are glad to find Mr. Sidney Lee, who has made a position as a painter of old buildings, appearing also in this exhibition as a powerful interpreter of the same class of subjects in etching.

CHURCH ENLARGEMENT, WEST HAM.—St. Aidan's Mission Church, in High-street, Stratford, has been enlarged by increasing the length of the nave and the addition of a chancel with vestries. The work has been carried out at a cost of 1,500*l.* from designs by Mr. Banister Fletcher.

THE AQUEDUCTS OF ANCIENT ROME.—(*Concluded.*)

BY DR. ASHBY, DIRECTOR OF THE BRITISH SCHOOL AT ROME.

FROM Capannelle to Rome there is no difficulty as to the determination of the course either of the Marcia (with which, as we have seen, the Tepula and Julia are by this time united), nor of the Claudia and Anio Novus; the Anio Vetus, on the other hand, hardly appears at all, and then only underground.

But before we deal with the remains of these aqueducts, it may be as well to mention shortly what little is known about the Aqua Tepula and the Aqua Julia, both of which come from the north-west portion of the Alban Hills. The former, as Frontinus tells us (*De Aquis*, i., 8), was constructed in 125 B.C. by the censors Cnaeus Servilius Caepio and Lucius Cassius Longinus. The springs were situated to the right of the Via Latina coming from Rome, and were reached by a by-road (*deverticulum*) which diverged near the tenth mile, and along which they were two miles distant from the high road. They consisted not of large pools, but of small springs, and lay lower than, and nearer to Rome than, those of the Aqua Julia; also, as their name implies, the water itself was tepid.

The spring has been identified quite certainly with the Sorgente Preziosa, on the south-west side of the Valle Marciana, to the right of the Via Latina between the tenth and the eleventh mile, and between one and two miles distant from the high road. The exact position may be seen in Map II. of *Papers of the British School at Rome*, IV.

The by-road by which the springs were reached is probably that which is indicated in the map as a doubtfully ancient line, diverging from the Via Latina just before the fifteenth kilometre stone is reached. This is the course given to the road by Rocchi (*Il diverticolo frontiniano dell' acqua Tepula*, Rome, 1891), and perhaps correctly; though there are no absolutely certain traces of it, none of the pavement being preserved *in situ*, while the presence of a few paving-stones in the vineyard walls can prove little or nothing as to its exact course. Lanciani, on the other hand (*Bull. Com.*, 1905, *tav.* VI.), makes this branch road run south-south-west along the line of a modern path to the bottom of the valley, and there terminate, believing, as he does, that the *deverticulum* mentioned by Frontinus is that which diverges from the Via Latina just after the tenth mile (see *Papers, cit.*, p. 131), but which, as far as I know, or have been able to discover on the spot, does not run farther than the Via Cavona (cf. Grossi Gondi, p. 59). Rocchi does not, as I there stated, consider the road mentioned by Lanciani to be that to which

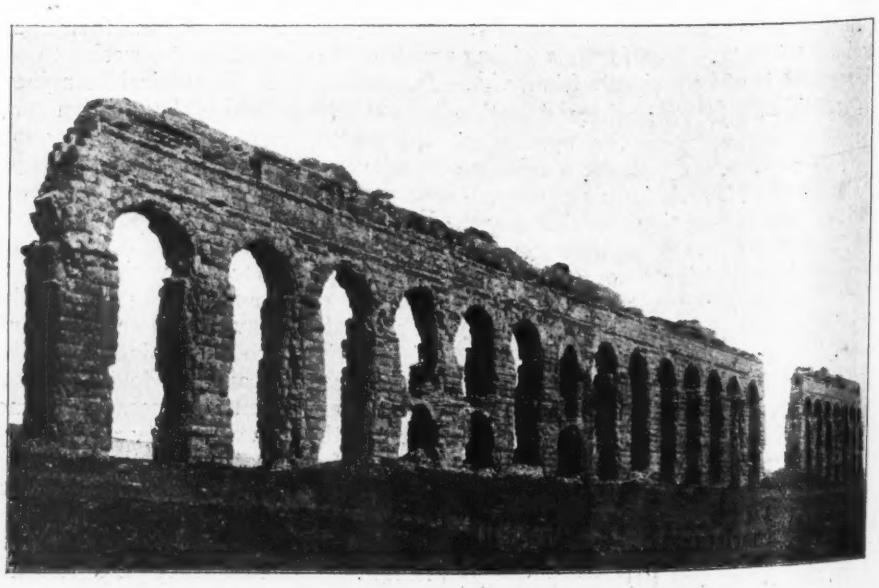

Fig. 24. *Aqua Claudia and Anio Novus: near Tavoluto.*

Frontinus refers—indeed he, wrongly, denies its existence altogether. The question raised by Grossi Gondi as to whether the reading of the passage in Frontinus should be *ad milliarium x.* or *ad milliarium xi.* (the latter only occurs in an inferior MS.) in his *Il Tuscolano nell' età Classica*, p. 52, is beside the point, if the measurement in my map is correct, while if that of Lanciani (which Grossi Gondi also follows) is right—cf. *Papers, cit.* 125—it definitely excludes the road he proposes. For *ad milliarium x.* covers the whole of the distance between the tenth and the eleventh milestones.

The water of the Aqua Tepula is perceptibly warm—it was found, indeed, to have a temperature of 62 deg. F. in winter, while that of the air was only 46 deg. F. The distance, too, is approximately correct, though it is slightly less than two miles from the Via Latina, whichever is the by-road taken. From the springs the aqueduct must have followed the south-west side of the Valle Marciana, which soon passes through a narrow gorge; and this line must also have been followed by the Aqua Julia, to which we may now turn.

The springs of the Aqua Julia were, according to Frontinus (*de aquis*, i. 9), situated on the right of the Via Latina between the twelfth and the thirteenth mile (*ad milliarium xii.*), two miles from the high road. They may thus be localised about two miles farther up the same valley, close to the Ponte Squarciarelli to the east of Grottaferrata.

The road by which they were reached is not correctly indicated in my map already cited, but is better given by Grossi-Gondi *op. cit.* p. 60 *sqq.*, and map, following Rocchi, *L'antica via consolare al xii miglio della Via Latina* (in *Diss. Accad. Pont. Arch.*, Rome, 1900). He makes it diverge a little before the twelfth mile, but, as a fact, the first traces of it were found some way from the Via Latina, nearer the abbey of Grottaferrata, between it and the so-called Fontanaccio, so that the exact point at which it left the Via Latina is uncertain. The distance, again, would be slightly less than two miles.

About 200 yds. to the west of (downstream from) the Ponte degli Squarciarelli, the springs are still to be found; Lanciani (*Comentari di Frontino*, p. 296) describes them, noticing that while on the day of his visit to them (in October) not a drop of water was passing under the bridge, the springs themselves were most plentiful. And the site assigned is made quite certain by the discovery in recent years of two *cippi* belonging to the Aqua Julia, one fragmentary, one entire, both of peperino, and both bearing the same inscription *Jul(ia) Imp(erator) Caesar Divi f(ilius) Augustus ex s(enatus) c(onsulto)*. One was found rather farther upstream than the other; its number is mutilated (only the letters II remaining), and cannot be certainly restored; while the other bears the number CCCII. It is possible that they both bore the same number originally, for the *cippi* were arranged in pairs. Neither seems to have been found *in situ* from the published descriptions, which are cited in *Corpus Inscriptionum Latinarum*, vi. 31563. The second of them bears the usual indication of distance from the next *cippus*, 240 ft.; while in the first this, which comes in the last line, is no longer preserved.

Fig. 26.

Calculating the interval as being uniformly 240 ft., the length of the aqueduct would have been almost exactly 14½ Roman miles. Frontinus, on the other hand, gives it as 15½ (*loc. cit.*). We must presumably account for it, either by a difference in the point from which the reckoning was made, or by a mistake in the figures: for the engineering difficulties are slight, and there seems no possibility of there having been any alteration in the course of the aqueduct.

The aqueduct must have passed down the deep gorge to the south-west of the abbey of Grottaferrata, and so into the more open Valle Marciana, keeping slightly above the springs of the Aqua Tepula. Both must have left the Valle Marciana by the narrow opening by which the stream (now largely fed by their springs) passes between the hills which close it; but, despite careful search, there are no traces of either aqueduct to be seen anywhere along the valley, nor in the open country between the mouth of it and Capannelle. At Capannelle itself several *cippi* of the Aqua Julia were found in 1887 (see Lanciani's article in the *Notizie degli Scavi* of that year, p. 558)—traces altogether of four pairs of them, bearing originally the numbers 156, 154, 153, 152. The inscriptions are identical with that of the 302nd cippus; and the 156th and 154th pair were, respectively, 3·80 metres (12¾ Roman ft.) and 3·99 metres (13½ Roman ft.) apart, from the inside to the inside of the *cippi*. Adding in the thickness of the *cippi*, the distances become 14½ ft. and 15 ft. respectively. In both cases the inscriptions face towards one another—*i.e.*, inwards, which is not the usual method. Of the aqueduct itself no traces were found, so that it must have been running at a considerable depth below ground; and it was clearly not following absolutely the same line as the Tepula.

Fig. 25. *Aqua Claudia and Anio Novus: looking towards Rome.*

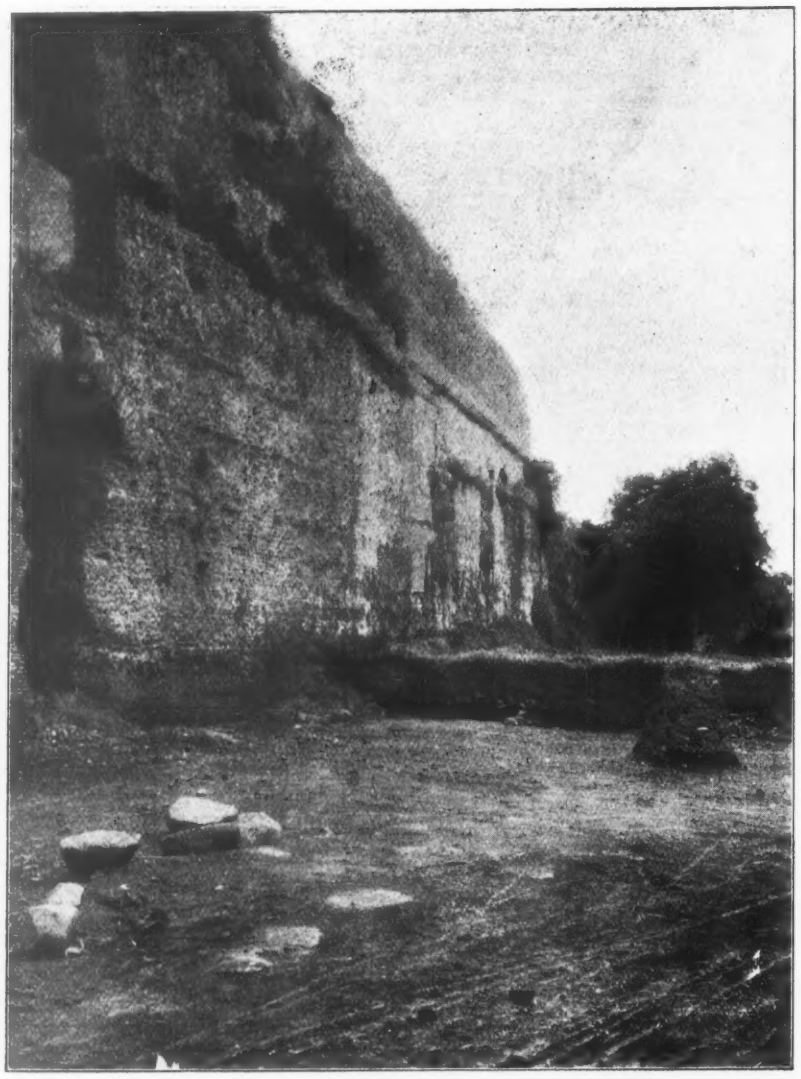

Fig. 27. Aqueduct Strengthened by Brickwork.

When they emerge above the ground-level, on the other hand, we find that the Marcia, Tepula, and Julia (the Marcia at the bottom) are already superposed, and they continue to run together as far as Rome.

The case of the Claudia and Anio Novus, which emerge a good deal sooner, being at a higher level (for the ground gradually slopes down from Capannelle (81 m. above sea-level) to Rome (49 m. above sea-level at the Porta Maggiore), while the aqueducts descend less rapidly) is precisely the same.

The *piscina* of the Anio Novus has already been described. In this district, indeed, before the seventh mile of the Via Latina from Rome Frontinus (*de aquis*, i. 19) tells us that six of the aqueducts—the Anio Vetus, Marcia, Tepula and Julia, Claudia and Anio Novus—had their *piscinæ—i.e.*, the filtering tanks which were necessary in order to reduce the amount of deposit before they commenced to run upon arches. Attempts have been made to identify the *piscinæ* of the other aqueducts, but without certainty having been attained.

A little beyond this *piscina* the channels of the Claudia and Anio Novus may be seen above ground, and already superposed. They cross at an acute angle the line of the Julia as given by the *cippi* described above. The rectangular channel of the Claudia is formed of blocks and slabs of peperino, slabs 2 Roman ft. (0·59 metre thick) being used for the floor and roof, while the sides are formed of three courses of blocks. The channel is 0·98 metre wide and 1·78 metre high. Above it is that of the Anio Novus, in concrete faced with brickwork and *opus reticulatum*, 1·05 metre in width ; the roof is not preserved at this point, and only begins to be so where the arches become considerably higher and where it is consequently difficult to obtain a measurement. Canina (*Edifizi*, vol. iv., pl. 232) gives, in his drawing at the highest arches of the aqueduct near Roma Vecchia, the height of both channels as a little over 1 metre and the width of each as about 0·70 metre, which is certainly incorrect, and does not tend to increase confidence in his methods.

The substruction continues for some 800 yds., after which begins the well-known series of arches by which these aqueducts are carried into Rome. These are described by Lanciani (*Comentari*, *cit.* 358), and are familiar enough to all visitors to Rome. A detail photograph of some of the most lofty arches near Tavolato is given in Fig. 23, a general view in Fig. 24, and a view of two longer stretches, somewhat nearer Rome, in Fig. 25. In these the restorations in brick-faced concrete, belonging to various periods, may be clearly seen. In many places, indeed, the concrete and brickwork alone is left, the blocks of stone having been removed for building material in the Middle Ages. The arches are preserved more or less along almost the entire distance into Rome. A detailed description would be somewhat unintelligible without the help of plans and drawings, and must, therefore, be reserved for the more complete work to which I have already alluded. A few further photographs of this portion of the course of the aqueducts will be found in an article by the present writer in *Public Works*, vol. ii., No. 3 (January 15, 1904, pp. 193 *sqq.*).

The aqueduct which carries the Aqua Marcia, Tepula, and Julia runs, as we have seen, at a somewhat lower level, and, therefore, emerges later from the ground. Its first arches, indeed, are seen in the immediate neighbourhood of the Casale of Roma Vecchia—a view of them is given in the article in *Public Works* already quoted—but they have suffered considerably from demolition in connexion with the construction of the Acqua Felice by Sixtus V.—far more, indeed, than the loftier arches of the Claudia and Anio Novus. Their course may be seen in Map I. of *Papers of the British School at Rom*, vol. iv., already quoted, and in Map I. of vol. i.

It will be seen that the latter cross and recross the former at right angles, enclosing a space in which the Goths encamped when attacking Rome in 539 A.D., while both aqueducts make frequent use of this means of diminishing the rapidity flow of the water; the best preserved of these sudden turns being visible within the mediæval Tor Fiscale, which has made use of this point of vantage.

Beyond the so-called Porta Furba—an archway by which the Via Tuscolana passes under the Acqua Felice—a modern road runs between the two aqueducts, and permits of their being advantageously studied. That it follows an ancient line has recently been made clear—the discovery of its pavement, and of a *cippus* of the Aqua Marcia, Tepula, and Julia, is described in *Bull. Com.*, 1905, 289 *sqq.* A view taken in it, showing two right-angled turns made by the Felice (of which the nearer turn only was made by Marcia, Tepula, and Julia), is given in Fig. 26, looking south-east ; the Claudia and Anio Novus make such a turn between the two

Fig. 28. Aqua Claudia and Anio Novus in Vigna di S. Croce.

seen in the photograph, but do not cross the lower aqueduct.

Another photograph, looking north-west (Fig. 27), shows the extent to which the Aqua Claudia and Anio Novus have been strengthened by brickwork; the aqueduct, originally, of course, consisting of stone arcades, has become a solid wall of concrete. On the south it has preserved more of its original character.

The aqueduct of the Marcia, Tepula, and Julia has been almost entirely destroyed—otherwise, it would appear on the right of the picture, running parallel to the other; but one of its *cippi* and the foundations of one of its piers were discovered. A little farther on is its best preserved portion in the neighbourhood of Rome; a photograph is to be found in the article in *Public Works* already cited, and careful detailed drawings of it have recently been published by R. Delbrück, *Hellenistische Bauten in Latium*, pl. I. (cf. pp. 1, 2).

Nearer Rome there is an interval in which comparatively few actual remains of either aqueduct are preserved; but when the city itself was reached, we find that a portion immediately before the Porta Maggiore was used by Aurelian and incorporated in his walls, and so, especially on the south side, was well preserved. The view, in Fig. 28, was taken some fourteen years back in what was then the Vigna di S. Croce. Since then the site has been occupied by some new barracks, and though the aqueduct itself remains as it was, its surroundings are far less picturesque.

Of the Porta Maggiore we spoke in the first and second of these articles (January 11, p. 38; January 18, p. 64). It is the ornamental archway by which the aqueduct of the Aqua Claudia and the Anio Novus crossed the Via Labicana and the Via Praenestina just after their divergence (cf. *Papers, cit.* I., 150), constructed by Claudius. Aurelian incorporated it in the walls which he began in 272 A.D. A view of it from the inside is given in Fig. 29. The Marcia, Tepula, and Julia enter the city immediately on the spectator's left of the photograph. Of the Anio Vetus no remains exist above ground; and the only portion of its channel now to be seen is in the short tunnel by which the railway to Naples cuts through the raised bank upon which the aqueduct of the Marcia, Tepula, and Julia passes near Tavolato. Here its subterranean channel was found; it is considerably larger than usual, and rectangular. Other traces of it have been found, but they were always subterranean; and it could, till a few years ago, be seen entering the city at the Porta Maggiore also, but its channel has now been blocked by a modern fountain. Here too it is probable (if not certain) that the Aqua Appia and the Aqua Alexandrina entered the city, but no traces of either have ever been found here, for they must have been travelling at a very considerable depth. The locality was in ancient times known as *Ad Spem Veterem*, from a temple of the goddess Spes (Hope) which stood hereabouts, of which, however, no remains have ever been found.

It was not intended in the present series of articles to describe the distribution of the water of these aqueducts within the city; while the other aqueducts alluded to at the outset, though they have many points of interest and deserve study, are of minor importance in comparison.

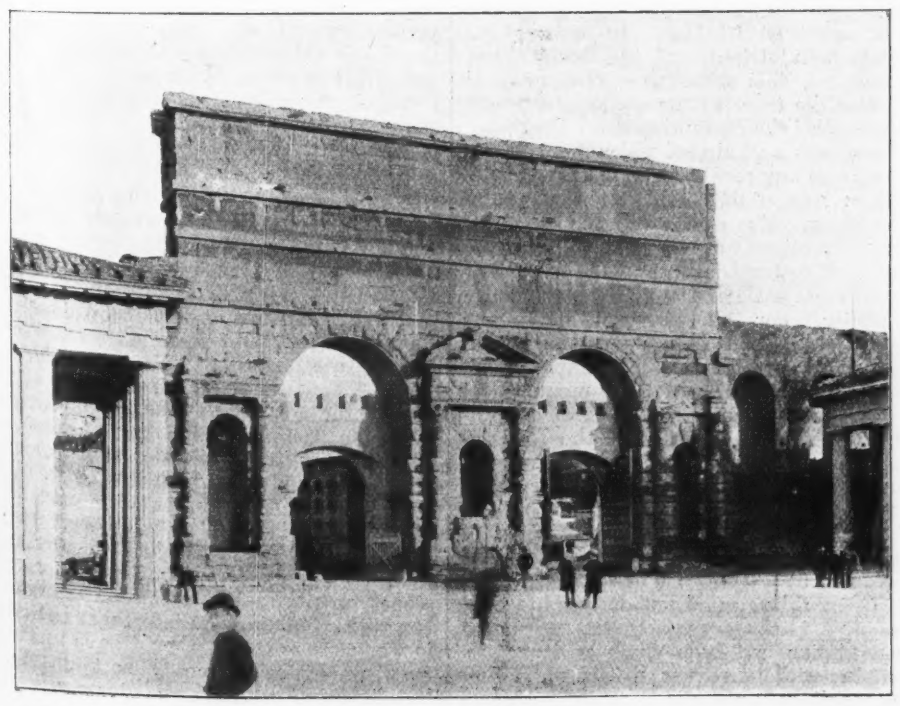

Fig. 29. Porta Maggiore: from within

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

In his second lecture, delivered on Thursday last week, on "Pergamos and Hellenistic Art," Professor Blomfield began by remarking that the contrast between Greek and Roman architecture had been somewhat unduly emphasised. Rome learned its architecture from Greece, but not the whole of it, and not all of it in one lesson. The value of historical study lay in leading the student to see how one attainment led up to another by imperceptible stages, so that though between one period and its predecessor there was no very marked change, yet after a long lapse of years the difference was so great as to appear almost a difference in kind. Having seen how the Egyptians and Greeks, though under very different circumstances, both attained to the grand manner in architecture, they found that shortly after Greek art attained its highest development in the Vth century its further progress was arrested by political catastrophes, and for the next step forward they must cross the Ægean to the bay on the coast of Asia Minor, where the Attalids built the royal city of Pergamos. There they found instincts and tendencies leading up to that masterful spirit of order which was to be the Roman's contribution to the art of architecture, together with some relaxation of the sure instinct of selection which characterises the age of Pericles. The Attalid princes carried on the tradition of Hellenic art to within sight of the mighty architecture of Imperial Rome. They were in close touch with Greece in the first instance, and with Rome in the last, and they must rest for awhile at this half-way house in order to understand the gradual transformation of Greek art into Roman. Referring in terms of high praise to the great illustrative work of MM. Pontremoli and Collignon in their exploration and restoration of the city and temples of Pergamon, Professor Blomfield gave a brief sketch of their characteristics, referring especially to the altar of Zeus Soter, peculiar amongst works of antiquity not only for its size but for its astonishing sculpture, rendering it one of the wonders of the ancient world. It was built under Eumenes II., probably about 183 to 173 B.C. The term "altar" was a little misleading, for it was rather a monumental structure designed for religious ceremonies, which included the altar. The fragments of the frieze at Berlin were among the most marvellous works of sculpture in the world. The height of the frieze was 7 ft. 8 in., and some idea could be formed of the scale from the fact that the fragments worked out to a length of 390 ft., and the estimated length of the frieze in position was 420 ft. No more gigantic enterprise in sculpture had ever been undertaken, for this frieze was not broken up by details, such as triglyphs, but was one continuous band running sheer round the building. As sculpture it was a prodigious *tour-de-force* in technique, for Hellenistic art had passed the stage of convention; it sought passionately for realism, and even for violent effects of emotion; and one could not imagine a subject more fitted for this kind of treatment than the fight of the Gods and Giants. These figures were calculated to be seen at a distance, and in that clear light might almost have told their story to the plain below; and as far as could be judged by the restoration, it might be said that it was in this point in particular that the Pergamene monuments touched the grand manner, in their subordination of all details to a great central conception. In great architectural sculpture it was of the first importance to keep the masses broad and simple; in other words, a design which resulted in uniform shadows scattered over the surface would defeat its purpose as architectural decoration, and would have the effect of a vermiculated surface.

What was remarkable in this Pergamene sculpture was its curiously modern character. It could not be classed as all in one category. The frieze of Telephus was weak and meticulous, and probably later work. Then there were the statues of Gauls wounded and dying, remarkable both for pathos and in some examples for violence of treatment, best paralleled in more modern art by the work of Bernini, while the gigantomachia foreshadowed the spirit of Michelangelo. It was the high-water mark of Hellenistic art. With the political downfall of Greece disappeared the intense if narrow patriotism of the city states, and the Greek artist became a man of no country, an adventurer, the artist of the world. The failure of his art, on occasion, seemed due to a want of conviction. These men could do everything equally well, but one thing was to them as another, and hence their exaggerated assertion, that forcing of the note which they hoped might take the place of genuine passion. All that technique, learning, and scholarship could do this art did, but it lacked that absolute and unconscious sincerity which set its seal of distinction on the art of ancient Greece. But in architecture Pergamene art marked a distinct advance. The architects of ancient Greece, perfect though their buildings were, had not arrived at the conception of groups of buildings linked together into one great architectural composition. The Akropolis certainly was not so planned. Greek temples and buildings were dotted about on rocks and ridges with little consideration for their effect on one another. Here was a chance for some thinker in architecture. The grouping of the buildings on the ridge of Pergamos, or round the semicircle of hills at Halicarnassus, was no mere happy accident. It was there to realise an effect foreseen and calculated.

The grouping of these monuments prepared the way for the splendid civic architecture of Greece and Rome, and they had their lesson for us. He warned them, not against archæology, but against unintelligent archæology, against rigid classification, against all that jargon styles and periods which divided history into water-tight compartments. That was not the way to study the history of architecture with any profit. Each phase of architecture was indissolubly connected with the architecture before and after it, and it was only from this standpoint that it was possible to arrive at its true significance, as a link in a chain of long development,—one more course in the building of the Palace of Art.

In his third lecture (Monday, the 24th inst.), devoted to "Rome," Professor Blomfield said that it was difficult for anyone who was not a trained archæologist and endowed with a quick imagination to realise the magnificence of Imperial Rome. In the Middle Ages the great buildings of Rome were used as stone quarries. Nor were the Popes of the Renaissance any better. Even in 1751, when Piranesi published his first prints of "The Magnificence of Rome," buildings were standing which have since completely disappeared. The Pantheon alone preserves its glorious dome, and we have to take largely on trust the astonishing accounts of the wonders of Rome, which are unearthed for us by scholars and archæologists.

In speaking of Roman architecture, he meant that of Imperial Rome; the rigid conservatism of the Republic did not encourage great enterprise and magnificence in building; it was not till the time of Augustus that the age of great public buildings began. Hence they must not rely too much on Vitruvius, who did not live to see the great monuments which are the glory of Roman architecture.

The heirs of all the accumulated treasure of Pergamos were the Roman people; but they could not find in Italy artists able to deal with those standards, and they had to call in the competent and cosmopolitan Greek, just as fifteen hundred years later the courts of France and England sent to Italy for their artists. Under Roman impulse architecture assumed an entirely fresh character. To perfect form, proportion, and detail—the lesson of the Greeks—the Romans were indifferent; but they were masterful constructors. They drew from Greek art what they wanted, and then passed on to the realisation of their own ideals. There was a direct motive to great monumental building, both in the desire of despotic emperors to captivate the people by great architectural schemes, and in the high degree of civilisation attained under the Empire. The conditions of life then were far more closely akin to our own than in any other period of history. There was also an element peculiar to Italy—the passion for great size and vast effects. These influences gave Roman architecture its bent and general tendency, but its technique could only grow from within, through experiment in meeting the problems of practice, the most formidable of which was the covering in of the great enclosed spaces of such buildings as the Baths. The methods invented by the Roman builders formed one of the most notable advances ever made in the history of architecture. They had been familiar with the use of the arch, and possessed on the spot the materials for an admirable concrete; while they possessed in their burnt bricks an absolutely trustworthy material. Timber for centering was scarce in Italy; their practical instinct solved the problem by using brick arches as centering, treating their brick construction almost as one might treat iron or steel—a self-supporting framework to be filled in afterwards with concrete. Never in the whole history of architecture had brick and concrete been used so scientifically and with such splendid results. Construction such as this would depend very largely on the exact composition and manipulation of the concrete and the accurate setting of the bricks, so that here there was not only profound calculation, but the very finest tradesmanship on the part of the workman. It was the builder's art in its highest perfection; this, too, under a ruthless despotism. In the later days of the Empire, when that iron hand was loosened, the secret of this construction was lost. Thus all the conditions for magnificent building were present: rulers whose set policy it was to improve the city; a people who expected and appreciated fine building; practically unlimited wealth; and, one might almost say, unlimited building ability. Perhaps nothing less than this could have changed Rome from the city of brick to the city of marble. He would call their attention to certain aspects of their architecture, in order that they might realise to some extent the magnificence of Rome and the standpoint of the Roman architects.

The most remarkable example was the Pantheon, erected by Hadrian in 120-124, with a dome of 142 ft. 6 in. span, lit only by the opening to the sky in the crown of the dome. It was more impressive than St. Peter's, partly from its great size, partly from its simplicity of design. The point of special interest to the student was the construction. It was, in fact, a massive and elaborate brick framework filled in with concrete, and it was only by the most scientific adjustment of the relieving arches and the disposition of the concrete filling that it was possible to construct this vast unbuttressed dome. The remains of the Basilica of Maxentius, with the huge fragments of the concrete vaulting overhanging by some 8 or 10 ft. the spaces once occupied by columns of Egyptian granite, was an astonishing instance of the strength of Roman building. Even more notable was its splendid plan of a central nave, 80 ft. wide by some 230 ft. long, in three bays. The Tepidarium of the Baths of Caracalla, 183 ft. by 79 ft., was also in three bays and vaulted, with colonnades at each end leading into further halls, each about 79 ft. by 60 ft., and again beyond these were archways communicating with the Hemicycles in the sides of the Peristyle Halls. Some idea of the noble effect of these Roman halls might still be gained from the interior of the church of S. Maria degli Angeli, the nave of which was, in fact, a conversion by Michelangelo of the Tepidarium of the Baths of Diocletian. It is about 80 ft. wide by 210 ft. long, vaulted with quadripartite groining, springing from eight columns of Egyptian granite of the Corinthian and Composite order, some 50 ft. high. In spite of its having been stripped of its marbles and decorations, this great nave still retained much of the true Roman quality, to which he had called their attention in the Pantheon. Its span was a good deal wider than that of the nave of any mediæval cathedral, yet the vaulting was of the simplest abstract form of vaulting. Everything but the essentials of construction was eliminated from the main architectural form, and the effect was got by great scale and a spacious and noble simplicity. For all purposes of public buildings the halls of the Roman Baths and Basilicas remained an unapproachable model, not only on account of their monumental quality, but because of their exact adaptation of means to ends. With the Imperial architects, the forms of architecture were so much clay in the hands of the potter, to be moulded to the condition of each new problem of building. The most signal example of this was the Colosseum, a vast amphitheatre measuring 620 ft. long and 513 ft. wide, rising 157 ft. from the ground, and designed to meet the most intricate requirements. The exterior design had been much criticised, he thought, without reason; it did not follow the moldings, proportions, and ornaments found elsewhere; but there was no such thing as one absolute standard of architecture. The healthy admiration of the XVIth century for such buildings as the Colosseum was a safer guide.

Referring to his previous remarks as to largeness of conception as one of the principal elements of the grand manner, Professor Blomfield observed that the habit of hand-to-mouth thought was disastrous in architecture. This point was lost sight of in the last century; or rather, the mischief began in the XVIIIth century, owing to the rise and rapid development throughout civilised Europe of what was called the Romantic school. The full extent of the loss which had followed this break with the classical tradition had hardly been realised. The failures in municipal design, the feeble and uncertain attempts at laying out great public spaces, the want of organised thought in dealing with cities, were its direct results. To recover some of that older tradition, of this larger intellectual background of architecture, should be one of their chief aims; and the road towards it led through the study of the architecture of Imperial Rome. No rulers in history had ever done so much for their cities as the Cæsars did for Rome.

The scale of the Imperial buildings was as remarkable as their quantity. The Colosseum is said to have held 87,000 spectators; the Circus Maximus, as completed by Trajan, is said to have held 250,000. It was oblong in plan measuring some 2,000 ft. by 600 wide. The seats, all in marble, were ranged along the sides in tiers. As a spectacle, the Circus Maximus could hardly have been inferior to the Colosseum itself. Probably no city in the world had ever possessed such a magnificent group of public buildings as those of the Roman Fora at the time that Trajan built his Forum. The site was irregular and limited, but the Romans did not hesitate to cut far back into the hill-sides to increase the area, and to arrive at that symmetrical plan which to the Roman mind was absolutely essential. The planning proceeded on main axial lines. Standing in the Forum of Nerva, opposite the steps to the Temple of Minerva, at the north-east end, the spectator looked through openings in the surrounding colonnade across the Forum of Augustus to the Arch of Trajan on the further side, and through that again across the Forum of Trajan to the Basilica Ulpia; on the further side of the Basilica towered Trajan's column. The vista must have been superb, as the eye passed in and out of sunshine and shadow, through marble colonnades to the brilliant light of the open courts. These courts were paved with costly marbles. The floor of the Forum of Trajan, some 23 ft. below the present ground level, was found to be of green and red porphyries, Numidian, white, and other marbles, arranged in bold geometrical patterns. The surrounding walls were 110 ft. high, lined with polished marble, with marble columns, and the most sumptuous decoration.

It was significant that the architect of Trajan's Forum, the last and greatest of the Roman Fora, was a Greek, Apollodorus of Damascus. The artistic ability of the Greeks was as active as ever in the East, and was producing in Syria, as at Antioch, Palmyra, and Baalbec, a monumental architecture scarcely inferior to that of Rome. Few buildings give a more vivid idea of the greatness of the Roman Empire than the Temple of the Sun at Baalbec, 286 ft. long by 170 wide, with columns 65 ft. high and an entablature 13 ft. high, and its enormous trilithon of stones, each about 63 ft. long, 12 ft. high, and 11 ft. deep. The tomb of Thedoric at Ravenna, with its cupola formed of one enormous stone, was also by a Syrian architect. Megalithic building was indigenous in Syria; it was strange that it should have survived from pre-historic times almost unaltered by successive civilisations. Rome was wise in its methods, and gathered up into

itself all that was worth having in the people and countries that came beneath his rule.* The starting-point of modern architecture was to be found not in the Temples of Greece, but in the vast achievements of Imperial Rome. It was misleading to compare Roman architecture with Greek, and pronounce on the superiority of one or the other, because in their highest developments the two were different in intention, aimed at different ideals, and expressed quite diverse kinds of intelligence. So far as perfect beauty of form and absolute proportion go, Greek architecture remained unrivalled; and there had not been wanting modern architects, such as Thompson of Glasgow, who insisted that the column and lintel were the last word in construction. To the mind that looked forward this view was impossible. We had learned to look at architecture as something more vital than an academical study in abstract beauty; as an art that will reveal itself in many ways and forms, according to the conditions with which it has to deal. It was by these conditions and the skill and resource with which it dealt with them, that architecture must be judged. It was because of its magnificent resourcefulness, of its masterful method of conquering every problem set it, that Roman architecture remained the greatest and most profitable study for the modern architect.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary general meeting of the Architectural Association was held on Friday, last week at No. 18, Tufton-street, Westminster, S.W., Mr. Walter Cave, President, in the chair.

The minutes of last meeting were read and confirmed, and Mr. C. Wontner Smith, Hon. Secretary, announced that at the request of Professor Beresford Pite, the visit to the London, Edinburgh, and Glasgow Assurance Building, Euston-square, had been postponed from Saturday, March 7, to Saturday, March 14. Members desirous of attending should apply to the Secretary for a ticket, as this visit is limited to fifty members.

He also announced a Camera and Sketching Club meeting on March 19, when a paper by Mr. Edwin Gunn will be read on "Timber, Brick, and Plaster in the Eastern Counties," at 8 p.m.

The President announced the election of Mr. H. D. Kidd.

On his motion, a vote of thanks was accorded to Mr. A. H. Ryan-Tenison for presenting to the Reference Library a folio copy of Wren's Churches by Clayton, together with a donation of one guinea to the Library Fund.

The President stated that the Rowing Club was about to start its regular practice. Those wishing to join should send in their names as soon as possible, for unless the Club had sufficient support now they would be unable to make the necessary arrangements.

Oxford.

Mr. Edward Warren then read the following paper on "Oxford":—

"To deal with Oxford from any point of view, the historical, the architectural, the archæological, or the merely picturesque, and in any adequate sense, is a tremendous undertaking, and requiring at once far greater knowledge and powers than I possess, and much more time than you would be at all inclined to accord me. Weekly lectures for a year or two might do the subject some justice. It ought, at any rate, to be dealt with under several headings, each implying a separate lecture, such as Historical and Topographical, University and Collegiate buildings, Domestic and Ecclesiastical buildings. A single evening's paper might be fitly bestowed upon any one of the principal colleges. I therefore ask your indulgence for a necessarily rapid survey of some of its existing buildings, with a few side glances at their predecessors, and such superficial hints at their individual history, and at that of this wonderful old city, as may serve to increase the interest of my illustrations. I have always felt myself that Oxford occupies, with regard to the other ancient and beautiful towns of England, a position of comparison somewhat akin in a fanciful sense to that occupied by Venice in relation to the sister cities of Italy. It is the unique city.

A much more general and natural comparison is, of course, that with the rival University city of Cambridge. But it is far from my purpose this evening to institute any such comparison.

The origin of the ancient city of Oxford, or Oxenford, to use the still more ancient and fuller Saxon title, was, like that of most of the towns of England, due to the natural selection of a defensive military position for an agricultural centre, a position, moreover, well supplied with water. Water indeed, that prime necessity of all habitations, is in such abundance at Oxford as to be at times in uncomfortable superfluity.

If you will consider for a moment the site of Oxford you will see that a town on such a site was inevitable. The gentle rise of a gravel spit in the midst of a marshy plain, between the twin waterway of Thames and Cherwell, with three fords, practicable in all but times of flood, across the former above its confluence with the latter. The waterway of Thames giving communication with the whole of its lower reaches and, by London, with the sea. The land around Oxford and between the hills, which closely approach it on the north-west and north-east side, being an excellent grazing country for flocks and herds, an agricultural settlement grew up, while the fishing in the rivers, and the ford for cattle which gives its obvious name to the city, brought a contributory accretion of trades which gave early importance to the town. The earliest town, indeed, can have been little more than a wattled kraal or enclosure between the rivers. But it was always relatively a strong position, and its military importance partly arising from the needs of its protection, and partly from its strategic position as a strong link in the chain of river fortresses continued by Wallingford, Reading, and Windsor to London, and as a central point whence the great roads to the north and west diverge, is probably the earliest claim to distinction which Oxford can make, an association somewhat difficult to realise to-day, but which, in the XVIIth century, and during the civil war, was still sufficiently prominent.

Oxford owed her earliest fame to the sword rather than the pen. Of military dominance the signs that remain are the Castle mound, which probably represents the West Mercian stronghold, and fragments of the old city wall, large portions of which are still to be seen on the north side of New College, the west side of Long-wall, at the back of the modern houses on the south side of King-street, and along the south-western boundary of Merton College Gardens.

It must be remembered that Oxford was an obvious military stronghold and place of strategic importance as being the south-eastern frontier post of the Kingdom of English Mercia. Anthony a' Wood in his well-known "Survey of the Antiquities of the City of Oxford," composed between 1661 and 1666, states that "the first foundation and building" of Oxford "is by some attributed to Mempric, who was king of the Britannes in the year of the World 2954 and before Christ 1009," but he further says, "as for mine owne part, I shall not insist upon it, for as much (as I have elsewhere said) the actions and occurence that was done in those obscure ignorant and disturbed times are chiefly delivered upon aime and conjecture." Thus Anthony a' Wood, and I think we must be content to regard the origin of Oxford as attributable to an indefinite and very early period.

We, as students of architecture, at any rate will be chiefly concerned in such architectural evidences of the history of this notable little city, as still remain, or of which we have graphic record. Of Oxford, before the Norman Conquest in 1066, there is not much that actually remains, but there are a few Saxon and early Norman fragments, the most conspicuous of which is the tower of St. Michael's Church, close to which stood the North Gate, or Bocardo, destroyed in 1771, and which seems to have served as a watch-tower connected with the rampart on the city wall, a doorway on the northern face of the tower gives existing evidence of this connexion, which is, as Bristol, Chester, and other cities show, a not uncommon arrangement. St. Michael's is one of the four Oxford churches mentioned in "Domesday" book. The tower is thoroughly in the Saxon manner built with battering-walls of rough rubble, without buttresses, and showing the typical long and short quoins at the angles, this tower still retains the characteristic windows with mid-wall shafts or mullions and the heavy abacus whose length corresponds with the depth of the arches. The church seems to have been repaired and partly rebuilt under Robert d'Oilgi, after the Conquest. At the east end of the cathedral there is some Saxon work to be seen. It is probable that the shape and disposition of the old city, with its walls, was, at the time of the Norman Conquest, much as we see it depicted in Agas's map, but its buildings were, of course, very different, and the proportion of building to open space much smaller. The four main gates existed until relatively modern times, and the principal bridges, Grandpont and Petty Pont, or Folly and Magdallen bridges, exist to-day.

Stone buildings were rare in early towns, the walls were the great protection, and the dwellings chiefly of wood or wattle, the churches and religious houses, the military buildings and houses of nobles or great offices being of stone. Soon after the Conquest Jews seem to have settled in Oxford in considerable numbers, and occupied a quarter known as the Great and Little Jewry. It is said that some of the earliest stone houses were probably due to them; and Mr. C. W. Boase in his book on Oxford, says that nearly all the larger houses, which were afterwards converted into halls, bore traces of Jewish origin in their names, such as Moysey's, Lombards', and Jacob's Hall. The Jews probably needed the protection afforded by stone walls against the Gentile inhabitants of the city.

It is not clear how soon after the Norman invasion, or in what manner, Oxford passed under the sway of the Conqueror. The town probably submitted with Edwin Earl of Mercia without capture by storm or siege. The account of Oxford in "Domesday" book shows it to have had, inside and outside the walls, 721 houses, of which 478 were unoccupied and ruined, 243 only paying gold or tax. Amongst these latter were twenty "wall mansions" belonging to the King, and paying a yearly tax. These houses were so called because, at need, and by the King's command, their occupants were bound to repair the city wall. There was one mill, the Castle Mill, within the town, and one on the Cherwell at Holywell, both still existing, but, of course, modernised. At Oxford, as elsewhere, the Normans soon began to build and improve, and of Norman work there is still something to show, though much has been destroyed or altered out of recognition in succeeding centuries. The nave and choir of the Cathedral, now bearing an elaborate fan-vaulted XVIth century roof, are Norman, and are probably part of the work carried out by Prior Guimond in the latter half of the XIIth century. The early church was dedicated to St. Frisdeswide,

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* Yet, may it not be added, always imposing its own architectural ideal. A Roman triumphal arch is the same thing everywhere, whether found on the soil of Italy, Gaul, or Africa.—ED.

who died in the VIIIth century, and whose remains lay there, and are said to have been removed "from an obscure to a more noted place in the church" in 1180, as a part, apparently, of a great scheme of rebuilding and amplification. Traces of the earlier Saxon Church exist still at the east end. This earlier church seems to have been restored under Ethelred II. about A.D. 1004.

Robert d'Oilgi, or d'Oyly, to whom, as representative officer of the Conqueror, various houses within and without the walls, a mill, and some land were granted, began, in or about 1071, to build the castle, and in 1074 the church of St. George within the Castle, the crypt of which still survives, though partly reconstructed.

The tower of St. George alone remains of the castle. D'Oilgi and his house seem to have been piously busy with ecclesiastical as well as secular and military buildings, and the Norman restoration of St. Michael's Tower, the crypt and chancel of St. Peter's in the East, the chancel arch of Holywell, and the doorway of St. Ebbe's are attributed to them.

One of the finest instances of Norman architecture, on a small scale, in England, exists in Iffley Church, about two miles from Oxford, and though this does not properly fall within the limits of my subject, I cannot help referring to it, though it is probably well known to most of you. Henry I. made Oxford a Royal residence, and about 1130 had completed the building of a palace at Beaumont on a site near Worcester College. Of this nothing remains, but its name is commemorated in Beaumont-street. Henry II. seems also to have frequently occupied this palace, and granted to the city of Oxenford, about 1161, a charter confirming liberties, laws, customs and tenures.

In 1190 a disastrous fire occurred which burned most of the town, and naturally incited the citizens to use stone in building, at least for the party walls of adjoining houses. Mr. Boase says that the houses at this time had only one story above the ground floor, the solar above the cellar, and Wood states that in poor houses they erected a high stone wall between every four or six or more houses, to arrest fire, and that "our burghers took example from the Londoners, that whereas the houses were builded of wood and straw, they began afterwards to build with stone and slate": and "upon the coming up of this fashion of building with stone, such tenements that were so built were for the better distinction from others called stone or tiles halls." And he goes on to say that other houses were similarly styled according to their materials or external features, as, for instance, an early house having that rarity, glazed windows, was called Glazen Hall, a house with leaden roof, Leaden Hall, or, in one instance, Leden Porch, and those with staples to their doors, Staple Halls.

Oxford at the beginning of the XIIIth century must have been, like most mediæval towns in England, a poor, shabby, squalid little place, though doing bravely its best to abate its squalor and rise to architectural pretensions worthy of its importance. Narrow, filthy, unpaved streets and lanes with horrible open kennels or sewers, dark and foul, with a few larger and better houses and halls, with a few handsome little churches, and the grim Norman castle dominating all. The meanness and squalor redeemed to some extent by the gardens of religious houses within the walls.

Of the earliest foundation of religious houses at Oxford there is no record. They probably grew up under the protection of the castle, and some of them as cells of the great neighbouring abbeys of Eynsham, Osney, Rewley, and Abingdon. In the XIIIth century several Orders were established, the Black Friars or Dominicans, the Grey Friars, or Franciscans, the White Friars, or Carmelites, and also Benedictines and Bermadines. Some of these orders founded hostels which afterwards grew, as we shall see, into Colleges.

Of the foundation of the University there is, again, no positive record, nor is there indeed any means of definitely appointing the period when Oxford began to be recognised as a seat of learning. The generally accepted idea, and probably the right one, is that the learned clerks of the religious houses naturally attracted students, and that with the increasing wealth and extending influence of the religious Orders there was an ever-increasing influx of learned men. The patronage and occasional presence of the Court probably assisted the learned reputation of the town. Oxford, at any rate, was a widely-known place of learning, and possessing definite schools, early in the XIIth century. Wood says that deeds of about 1109 mention School-street, and Master Robert Pullein, trained at Paris, began to lecture upon the Scriptures in Oxford in 1133. A chancellor is heard of as dispensing money for the use of poor scholars in 1214, and was appointed by the Bishop of Lincoln in whose diocese Oxford then was. With this brief sketch of the beginnings of Oxford, I propose to pass on to a roughly chronological consideration of the Collegiate and other buildings of the city.

Of the twenty-one colleges which form the federation that we know as the University, one alone, Keble College, is modern. There exists also, as a separate corporation, one of the old Halls, practically a small college, that of St. Edmund, doomed shortly, like its fellows St. Alban's and St. Mary's, to absorption by a college. As almost all the colleges are composed of buildings of different dates, and as many contain nothing co-eval with the date of their foundation, I propose to take them in the chronological order of their earliest existing portions, but otherwise to deal with each college individually and irrespective of chronology, and to take the University and other buildings in the same manner.

Of the Colleges the most ancient is probably Merton, founded by Walter de Merton, Lord High Chancellor to Henry III. in 1264.

Merton College.

The chief glory of Merton is its fine chapel, the stateliest in Oxford, built 1264—1300, the first high altar dedicated 1277, transepts 1414, tower 1448-51. It is a church of considerable size, and its choir is remarkably fine; a great variety of tracery is presented by its many windows. The east window of seven lights is remarkably fine. The chapel has suffered much by restorations and re-decorations, but contains many things of great interest, a fine brass lectern of 1458, and several admirable floor brasses. The hall was reconstructed in 1872 by Sir Gilbert Scott. The delightful old library, with its transverse double bookcases, chained books, vaulted ceiling, its roof dormers, and its narrow XIVth century windows and its elaborate-plastered wall spandrels, stands on the south side of the Mob Quadrangle.

St. Alban's Hall.

St. Alban's Hall, founded in 1220 by Robert de St. Alban, and now incorporated with Merton, has been much demolished to make room for new buildings.

New College.

New College, founded in 1379 as the College of St. Mary of Winchester by William of Wykeham, Bishop of Winchester, stands in the north-east angle of the ancient city, and, like Merton, was actually confined and bounded by the old fortified city wall. It has now strayed outside the wall to the street of Holywell, but the splendid old bastioned wall remains. It is said to have been inaugurated by a solemn religious ceremony on April 14, 1386, and retains, after more than 500 years, most of the buildings bestowed by the founder. New College presents the type *par excellence* of the XVth century monastic college, and has set the fashion in many respects to subsequent Colleges at Oxford and Cambridge. Its only rival at Oxford as a complete and stately exemplar of collegiate Gothic beauty is Magdalen.

New College is entered by an archway in the base of a square tower, which closes the grave and characteristic lane of approach. This approach, deplored by some as dark and disappointing, is to me one of the most delightful things in Oxford. The first quadrangle is somewhat marred in proportion by the addition of an upper story in 1674 to William of Wykeham's low buildings, and loses in scale and apparent ground area by this addition. To the left on entering is the splendid chapel; in front are the entrance to the dining hall, with its great flight of steps leading up into the cavernous archway of the muniment tower and the library. The beautiful gardens beyond, with their fine expanse of turf and their chestnut-trees, are reached by the garden court, built 1684, and still possess the "mount," which formed a feature of so many old gardens.

The Great Hall, 78 ft. by 35 ft., was originally about 40 ft. high, but was raised 10 ft. by Sir Gilbert Scott. The screen and linen fold panelling were given by Archbishop Warham about 1540 to 1550. The beautiful cloisters, with their chestnut timbered roof, overshadowed by the noble little bell tower, with sheer unbuttressed walls and simple octagonal stair turret, show as good an instance of unpretentious dignity and fitness as anything I know. The chapel is the stateliest and largest in Oxford; its east end, like that of All Souls, is filled with an elaborate niched stone reredos very much restored but effective at a little distance. The ante-chapel, whose groined roof is supported by two slim columns, contains some fine brasses and much splendid XIVth and XVth century glass.

Balliol College.

Balliol College, founded between 1260 and 1268 by John de Balliol, and carried out by his widow, the Lady Dervorguilla, runs Merton close in point of antiquity, but has, unfortunately, little to show of ancient buildings. It possesses, however, the fine old library, built between 1430 and 1480, and the old dining hall, about 1432, now a reading-room, as well as a beautiful oriel window of the XVth century, supported upon four traceried corbels, and forming part of the master's lodgings. The library and old hall contains a good deal of fine and interesting heraldic glass, and many fragments of English and Dutch glass.

Lincoln College.

Lincoln College, founded in 1427 by Richard Flemyng, Bishop of Lincoln, and reconstituted in 1478 by his successor, Bishop Rotheram, is a small College—architecturally speaking—of a quiet order of merit, and occupies the site of an ancient hall, of which the existing kitchen forms part. First quadrangle dates from 1431, the hall 1436. The chapel is one of the many buildings at Oxford which show the architectural conservation of that city. It was consecrated in 1631, and is thoroughly mediæval in plan, with "perpendicular" details; but is fitted in oak and cedar of contemporary character, and is extremely picturesque and full of interest. Its windows contain much Dutch and Flemish glass, excellent of its kind; and, in the ante-chapel, a pulpit from which preached John Wesley, once a Fellow of the College.

All Souls College.

All Souls College, founded in 1437 by Henry Chichele, of Higham Ferrers, one of the original Fellows of New College, and afterwards Archbishop of Canterbury, whose statue fills the niche over the entrance from High-street, owes its name to its dedication to the memory, as its Charter declares, of All the Souls of the Faithful Departed, and especially the souls of Henry V., King of

England and France, and of the faithful subjects of the realm who fell in the French wars. It is singular amongst all Oxford Colleges in the fact that it has only four under-graduates, known as Bible Clerks. The first little quadrangle, to which the High-street gate gives admission, is happily unaltered, and is an admirable instance of unostentatious perpendicular work. There is a delightfully simple disposition of doors and windows, which is worth attention, and the College contains one room, the old library, of a picturesqueness difficult to beat, and possessing a Jacobean plaster ceiling with lantern-like pendants of most unusual form. The chapel, 70 ft. by 30 ft., is in itself well proportioned and dignified, and has a good oak roof. Its eastern wall is filled by a splendid stone reredos, walled up about 1664, and again opened out in 1876. Its niches, some 130 in all, small and large, contain modern statues by Geflowski. In the ante-chapel, which is separated from the chapel by a classic screen, attributed to Sir J. Thornhill, is some most beautiful XVth century glass—to my mind the most interesting in Oxford. The hall is a good and well-proportioned room of 1729; it is attributed to Dr. Clarke.

Hawksmoor's great quadrangle is splendid in proportion, but its buildings are in the dismal mock Gothic of George I.'s reign. It commands a splendid view of the Radcliffe Camera. The great library, however, founded by Colonel Codrington, a former Fellow, is a splendid room some 200 ft. long, and contains over 80,000 volumes. It was built between 1716 and 1760, and its interior is admirable in proportion, and in stately detail of floor and ceiling.

Magdalen.

The College of St. Mary Magdalen, standing on the bank of the Cherwell outside the walls near the east gate of the city, and close to the old bridge of Pettypont which terminates the road from London, is, in beauty of position, amplitude of grounds, and intrinsic beauty of buildings, the most favoured College at Oxford. Founded in 1458 by William Patten, of Waynflete, in Lincolnshire, its earliest buildings range between the dates of 1475 and 1481. The older portions occupy the site of the ancient Hospital of St. John, and the first quadrangle, entered from the porter's lodge, is that of St. John, and contains the well-known external pulpit. The chapel, on the usual T-shaped collegiate plan, with ante-chapel, has been internally spoilt by ill-designed screen and stalls and very bad glass, which imparts an unnecessary gloom to the interior. Externally, however, it possesses the well-known and most beautiful west doorway with the pierced spandrels of the external arch. The cloisters with their buttresses supporting grotesques, the splendid Founder's Tower and Muniment Tower, and that glory of Oxford, the Great Tower, are all of remarkable and unique character, and the towers of extreme beauty of form and detail. The Great Tower, of characteristic XVth century design, was actually begun at the very end of that century. It is said to have taken about sixteen years to build, and to have cost only about 400*l*. It looks lofty, but is only about 120 ft. high to the parapet. The hall, recently re-roofed by Mr. Bodley, is one of the finest and handsomest in Oxford, and contains a wainscot of later linenfold panelling divided by fluted pilasters, said to have come from Reading Abbey, a splendid Jacobean screen supporting a gallery, and a high panelled backing to the dais of the high table.

The Grammar Hall, in St. John's Quadrangle, is a charming little building, and probably part of Magdalen Hall and the old school which preceded the College.

The "New Buildings" built in the deer park, between 1733 and 1735, by Holdsworth, are a fine, plain, well-proportioned range of Classic design, with an arcade ground story facing the College.

Brasenose College.

Brasenose College, whose buildings were begun about 1509, was founded by William Smyth, Bishop of Lincoln, and Sir Richard Sutton Knight. It occupies the site of older academic halls, Little University Hall, and another XIIIth century hall, called Brasenose Hall, which in its turn had replaced a brew house, known in Norman days as the 'Brasenhuis.' The gateway tower was finished in 1520, and admits to the first quadrangle, a well-proportioned little court, to which an upper story was added in the early XVIIth century.

The architecture of this College, and particularly that of the chapel, presents a singular medley of the Gothic and Classic manners. The chapel, 1668, and the library, 1663, are both attributed to Sir Christopher Wren. The former has a fan-traceried vaulted ceiling, said to have been transferred from the demolished chapel of St. Mary's College in New Inn Hall-street. If Wren was indeed the architect of these two buildings, they are examples of his early work, and obviously intentionally Gothic.

Corpus College.

Corpus Christi College was founded in 1516 by Richard Foxe, Bishop of Winchester, whose first intention seems to have been to make it a seminary for monks from St. Swithun's Priory at Winchester, and for a few secular scholars. The front quadrangle has suffered, like that of New College, by the addition of a story on two of its sides. In its centre is a large and elaborate sundial, mounted upon a tall shaft and surmounted by a pelican. The hall is small, but of excellent proportions; it was finished in 1516, and has a fine hammer beam roof and a picturesque and interesting screen. The chapel, 1517, has a painted panelled roof, stalls, and screen of cedar, and an altar piece of the Adoration, by Rubens."

[In consequence of the pressure of other matter, we are compelled unwillingly to divide our report of the Association. The remainder of the paper and a report of the brief discussion which followed will be given in our next issue.]

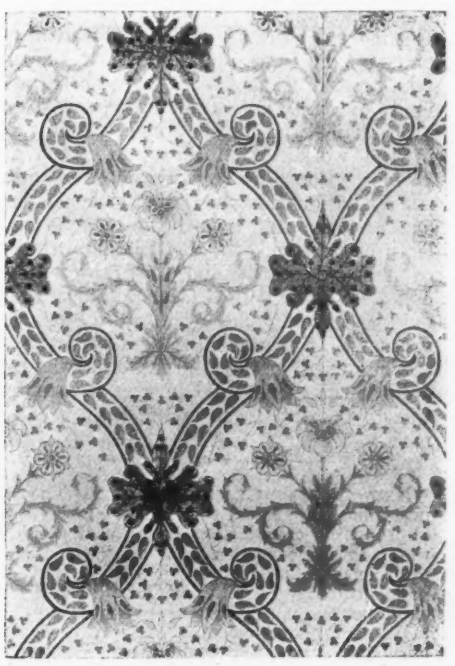
DESIGNS FOR WALL-PAPERS.

THESE designs for wall-papers are the work of Mr. Moore Gordon and Mr. G. E. Cormody respectively, of the Royal College of Art. They were exhibited last summer at South Kensington at the annual exhibition of students' work. The designs are charming in line and colour, and worthy of the best traditions of the old English school of designers.

ARMS AND ARMOUR IN PAINTING AND SCULPTURE.

AT the Royal Academy on Friday last week Viscount Dillon gave a lecture on this subject, in the course of which he expressed the opinion, although not an artist, that in many pictures of armed bodies too much armour was shown. The same error occurred also in many of the fine illuminated MS. For the artist desirous of reproducing armour as used in England at various dates there were two sources whence examples could be obtained, sources richer in England than in any other country in the world. He alluded to the wonderful series of brasses and the still richer series of monumental effigies. Both those sources were to be found in our churches, and no country except Germany in any way approached ours in the variety and excellence of these, generally contemporary, records of how their predecessors protected themselves. In both these sources of communication they saw the rise and fall of artistic skill, and the earlier perhaps in attention to detail might hold their own in comparison with later examples. Of course, the question of portraiture in brasses and effigies had been much written about, and although the actual likeness may not even have been attempted, yet the conventions of beards, moustaches, and so on were observed. In the fashion of the armour worn at various periods they saw the improvements which gradually came into use, and they had the advantage of knowing that the changes were verified by the corresponding effigies in the round. The monumental effigies often gave marked details of armour, yet the effigy of the Black Prince at Canterbury did not show a single strap, hinge, or buckle, while, on the other hand, the Warwick effigy was complete in every detail in strap, hinge, or rivet. They might generally trust to find painters like Mantegna and others most faithful in such details. An important point to remember was that uniformity in costume, both civil and military, was a comparatively modern idea, and the effigies and brasses generally all varied in some respect or another. Still, they found both classes of monuments coming from certain localities or schools of work much resembling each other. Having dealt with the different styles of armour in different centuries, the lecturer said it would be well to note some of the effigies and brasses which were accessible, and would be useful, to students. In the Temple Church there were figures reasonably supposed to range over the XIIth century and beyond, but they must

By Mr. Moore Gordon.



By Mr. G. E. Cormody.

Designs for Wall-papers: by Students of the Royal College of Art.

at once and for ever discard the idea that the crossed-legged effigy was peculiar to those who took part in the crusades, for many well-known worthies in those expeditions had their legs straight, while many who never went to the Holy Land had them crossed. For the period 1272-1327 they had in the brasses of the two d'Aubernions, in Surrey; of Sir R. Trumpington, in Cambridgeshire; and of Sir R. Septvens in Kent, excellent representations of the armed warrior, and these had all been engraved by Waller, Charles Stothard, and Blore. In the Louttrell Psalter, engraved by Carter, they had the knight on his warhorse. In the St. George, at Prague, of which a cast was in the Victoria and Albert Museum, would be seen a good example of the coat of small plates as in use in 1375. At Canterbury the effigy of the Black Prince, who died in 1376, gave a general idea of the best English military costume of that date. A cast of this was in the Crystal Palace, where the student would find many other copies of figures very useful to him, and, amongst others, a small figure of St. George from Dijon. There were also the brasses of the two Swinburnes, engraved by Waller from the original at Little Horkesley, Essex, which gave a good idea of the change of fashion from 1391 to 1412, and they saw how plate had driven out chain armour. In one of the wings of Van Eyck's famous Adoration of the Lamb they had knightly armour as seen in the Low Countries in 1420-1432. In Pisani's St. George and St. Antony in the National Gallery, painted in 1433, they would see how much advanced was the style of armour in Italy; while in Westminster Abbey the brass of Sir J. Harpenden, of 1457, showed a full armed English knight. For the figure in the round and with every detail, they could find no more exquisite model than the Beauchamp effigy at Warwick. They had also the magnificent St. George by Mantegna, painted in 1465, now at Venice. They next came to a period when paintings and drawings presented an embarrassment of riches in the matter of detail. There was the St. Michael of Botticelli, 1446-1510; the Colleoni of Verocchio, 1481; the Chase of St. Ursula, by Memburg, at Bruges; and numberless representations of armed scenes in pictures gave an endless list of authorities. For those who could not travel there was the famous MS. of the Earl of Warwick in the British Museum, and roughly engraved by Strutt. Coming to the XVIth century, they had the wonderful details of Albert Durer, Jost Amnan, Burgkmair, and other illustrious works. In the XVIth century they had in the numerous armouries of Europe splendid authorities of the armour and weapons in use, but they must remember that most of the armour was not used on the field of battle. The most valuable of the effigies and brasses had been recorded in the works of Stothard, Hollis, Waller, Hefner, Boutall, Hartshorne, and others. As a striking instance of the inaccuracies of artists in regard to armour, the lecturer referred to the pictures of Joan of Arc. Generally she was represented in complete armour of a later period, although evidence would show she wore very little armour. It should be remembered that the armour used in the tournaments was much stouter than that used in war, as the desire was to break a lance rather than break the man.

NEW POST-OFFICE, CHELMSFORD.—The new post-office in High-street, Chelmsford, is now approaching completion. The lower portion of the front is executed in Portland stone, the upper part being faced with red bricks, with panels of carved brickwork in bold relief. The construction is fire-resisting throughout, the main roof being executed entirely in concrete and steel, covered with green slates. The architect is Mr. H. N. Hawks, I.S.O., H.M. Office of Works; the builder is Mr. W. E. Blake, of Plymouth; and the clerk of works is Mr. G. C. Perkins. The carving was entrusted to Messrs. Daymond & Sons, of London.

THE CATACOMBS OF ROME AND THEIR RELATION TO CHRISTIAN ART.

ON Tuesday at the Royal Academy the Dean of Gloucester (Hon. Professor of Ancient Literature at the Academy) lectured on the story of the catacombs of Rome, specially in their relation to Christian Art. He said that it was when Queen Elizabeth was reigning in England that some workmen, digging for sand in a vineyard about a mile and a half from Rome, came across a subterranean cemetery in which were many paintings and inscriptions, and this recalled to the minds of the inhabitants of Rome that there existed beneath their feet the vast catacombs of the early Christians. For a century the searching of these catacombs was left to private individuals, and even when the Church intervened there was no real supervision over the searchers, who, in their zeal, plundered the catacombs, and carved out precious memorials to adorn churches and other buildings, and destroyed numbers of beautiful paintings in their efforts to remove them on plaster from the walls. It was not until 1668 that the catacombs were placed under State control, but even then inscriptions were removed, and no record kept of where they were taken from, and irreparable mischief had been done. It was not until 1841 that the investigations began to be carried out systematically, and it was to De Rossi that they were indebted for most of the knowledge now possessed. The catacombs were vast subterranean passages, excavated at different levels, and communicating one with another by narrow flights of steep stairs. They were not passages of a cemetery, but the cemetery itself, for the bodies were in the passages. Shelves were cut in the walls, in which the bodies were placed, and then the shelves were covered in with marble slabs and sealed up, and on these slabs were inscriptions. The family vaults showed that, although there was a brotherhood, there was no communism amongst the early Christians. It was estimated that there were 700 miles of these galleries existing, and personally he should think there were not less than 5,000,000 bodies interred in them. The period of interment was from 50 to 67 A.D. down to 300 to 305 A.D. After 312, when peace came upon the Church, the practice of burying in the catacombs virtually ceased. The lecturer proceeded to describe how, at first, Christian burial was without concealment, but the persecutions of Nero brought about the building of the catacombs. When the victory of Constantine the Great brought peace to the Church, and the catacombs were no longer used for burial, they were visited largely by pilgrims, and many peop'e were buried near to martyrs, which resulted in many paintings being ruthlessly destroyed. A great deal of damage was also done by the Goths, but not so much as by friends. Between 761 and 817 the bodies of many of the martyrs were removed to churches in Rome, and the reason for pilgrimages existed no longer, and gradually the existence of the cemetery beneath the City became forgotten. There was an idea that the Christianity of the first three centuries was absolutely hostile to art, and it was only of quite recent years that this conception was found to be absolutely erroneous. So far from looking on art as frivolous and harmful, the majority of believers adopted it, and it became part of their life as something they might enjoy. Dean Stanley had asked if it was possible to ascertain the thoughts and feelings of the early Christians, for the books of the period were few, and were for the most part the works of learned scholars. Strange to say, after a lapse of nearly 2,000 years, the answer was to be found in the catacombs of Rome. They found pictures, although many of them were mutilated, and the artists were evidently men of no mean power. In the Vth and the two following centuries the catacombs were the object of great veneration to pilgrims, but it was the shrines of the martyrs which attracted their attention; and to the paintings and inscriptions on the thousands of tombs, which told of the life and hopes of the first generations of Christians, they paid little heed. Recent study of the catacombs threw much light on the life and thoughts of the early Christians. There was no doubt that in the Christianity of the first days there was a school of teaching which more or less discouraged art and looked askance on painting and sculpture. Two currents of this feeling existed, the one derived from the synagogue and the other from the Pagan Temple. The strict Hebrew, of course, viewed all painting and sculptured figures with intense repugnance; and, on the other hand, the Pagan temple was richly adorned with painted and sculptured figures, and the close connexion of the Church with the synagogue would account for the feeling at first. They found, however, in the catacombs that this dislike and repugnance to art was emphatically not universal, and was not even the ordinary feeling of the mass of Christians during the first two centuries, and amongst the wreckage of this City of the Dead they had examples of elaborate decorative art. After the first two centuries there was a marked deterioration in the art, but this was not due to Christianity, and showed itself in all the work in Rome. In the IVth century the garden scenes, the roses and vines, and paintings of the Good Shepherd gave place to historical subjects, and as time went on the sufferings of the early Christian martyrs became a favourite subject. No doubt there was an absence of sculpture in the catacombs, but the effect of the paintings in this City of the Dead from the time of the Apostles to the peace of the Church might be said to have popularised painting, and painting became the church art. Sculpture, on the other hand, possessed no such hallowed traditions. Still, the extreme rarity of sculpture was not due to any lack of appreciation amongst the early Christians, but simply as a subject of decoration it was impossible in the catacombs. The painter could pursue his art in all secrecy on the walls of the dead, but the studio of the sculptor would have had to be above ground in the great city, and in those days the life of a Christian sculptor would have been in daily peril.

Legal Column.

EASEMENTS OF LIGHT AND AIR.*

ACQUISITION OF EASEMENT.

By Continuous Use for Twenty Years.—The most usual method of the acquisition of an easement of light is by its continuous use and enjoyment for twenty years, and the proof of the length of time is sometimes a matter of difficulty to the dominant owner.

It must be remembered that although the right cannot be acquired under the twenty years, yet, as it must be interrupted for the whole period of twelve months it follows that nineteen years and a small portion of another year prevent the possibility of contesting the right. Although at first sight this may appear strange, yet on reflection it is obvious that there was absolutely no other way of deciding this point, the law being that the interruption to the twenty years must continue twelve months, clearly, therefore, a man who commenced to stop a light after the nineteen years had elapsed could not before the expiration of the twenty years have interrupted that light for a period of twelve months, and, therefore, as no twelve months' interruption could occur the Courts held that the light was acquired (*Flight* v. *Thomas*, 11 A & E., 688; 8 Cl. & F., 231).

Thus, it will appear that although by law

* A paper read before the Architectural Association Discussion Section, on January 29, 1908, by Mr. H. Phillips Fletcher, F.R.I.B.A., F.S.I., A.M.I.C.E., barrister-at-law.

twenty years is necessary for the acquisition of the light, yet, should anyone take steps to contest it by erecting obstructions, nineteen years and one day will defeat his attempt. Nevertheless, such right is not completely established until the expiry of such twenty years. That is to say, it is *inchoate* till such completion of the said period, and the Courts will not interfere till such completion is accomplished. This was held in the case of *Lord Battersea* v. *The Commissioners of Sewers* (1895 ; 2 Ch., 708), where the Court held that no action could be brought till after the twenty years from the commencement of the enjoyment.

Similarly in *Bridewell Hospital* v. *Ward* (1893 ; 62 L. J., Ch., 270) the Court declined to grant an injunction as the twenty years was incomplete, but intimated that a mandatory injunction could be granted after the statutory period had been completed.

In the case of *Parker* v. *Mitchell* (11 A. & E., 788 : 1840) it was held that although the defendants had enjoyed the easement for fifty years before the action brought, yet as they had not so enjoyed it during the four years immediately preceding the action, they had no right to the easement. See *Tilbury* v. *Silva* (45 C. D., 98) and *Presland* v. *Bingham* (41 C. D., 268).

By Express Grant.—In the case of *Broomfield* v. *Williams* (1897 ; 1 Ch, 602) the Court of Appeal reversed the decision of the Court below, and Lord Justice Lindley held that under the Conveyancing Act (1881) a grant of light is deemed to be *included in a conveyance*, and the fact that adjoining land was shown on the conveyance as "building land" does not show a contrary intention with regard to sect. 6, sub sect. 4 of such Act.

How Easements are Acquired by Implied Grant's :—The principle underlying this form of easement is that a man cannot derogate from his own grant. This form of case frequently arises in the development of estates where specific covenants as to easements are not inserted in the lease.

In *Palmer* v. *Fletcher* (1 Sid., 167 ; 1 Lev., 122 ; 1615), a man built a house on one part of his land and sold it to the plaintiff, and afterwards sold the adjoining portion to the defendant. Held that, although it was a new messuage, yet a person who claims the land by purchase from the builder cannot obstruct the lights any more than the builder himself could, who could not derogate from his own grant, for the lights are a necessary and essential part of the house.

The case of *Pollard* v. *Gare* (L. R., 1901, 1 Ch., 834) is a more recent decision, and in this case the plaintiff entered into a building agreement, and upon the completion of the same obtained the lease in the usual manner. The adjoining land was marked out in building plots, and a building line was marked on the plan so as to extend to all the plots. The rights to build remained, but the Court held that there was nothing to give the granters liberty to build so as to interfere with the access of light to the plaintiff. Held that plaintiff was entitled to an injunction restraining defendant from building on the land so as to interfere with the access of light to the plaintiff's house as hitherto enjoyed. See also *Quicke* v. *Chapman* (1903, 1 Ch., 659) ; *Godwin* v. *Schweppes* (1902, 1 Ch., 926).

By a Dominant and Servient Ownership distinct from each other :—While the right to light and air by its continuous use and enjoyment for twenty years may, unwittingly, be affected by purchases of the adjacent property by oneself or others, it is consoling to reflect that, although you may hold your property on lease from the same ground landlord, still your adjacent owner cannot use that fact to your prejudice. The celebrated case in this matter is *Frewen* v. *Phillips* (in the Exchequer Chamber, upon error from the Common Pleas, 11 C. B., N. S., 449 : 30 L. J., C. P., 356 : 7 Jur., N. S., 1247), approved and followed by the House of Lords in *Morgan* v. *Fear* (1907, W. N., 196 : 1906, 21 Ch., 406). The plaintiff and defendant held the leases of two adjoining houses, both demised by the Duke of Portland in 1788. In 1857 the defendant built a conservatory obstructing the plaintiff's windows. It was held that the plaintiff might maintain his action against the defendant for so doing.

Circumstances Affecting the Acquisition.

Non-completion of House or Building :—I think this is so important that I may well devote a separate table to its consideration. It has been so frequently stated that the continuous use for the fixed period of twenty years gives the right, and that to prove the enjoyment for that fixed period is the essence of the case for the plaintiff, that it may surprise you to know that *occupation* and *enjoyment* need not extend to the whole of the period required to create such *ancient light*, and that the period of prescription begins as soon as the windows are put in the dominant house, capable of being open and shut and of admitting light.

Non-occupation :—It is not necessary that the house should be occupied : *Courtauld* v. *Legh* (L. R., 4 Ex., 126). In this case it was held that, though the fittings, papering, etc., were not completed for five years after the time commenced to run necessary to create the statutory right to ancient lights, this did not interfere with the effluxion of time necessary for the acquirement of such light. Further, that, notwithstanding the necessity of the enjoyment for the fixed period, yet although the house was really uninhabitable, and was not, as a matter of fact, occupied for some years after the commencement of the running of the time to create the ancient light, the Court of Exchequer held that the right had accrued from virtually the completion of the carcase of the building ; and it may interest you to know that as to the enjoyment (which, as no tenant had enjoyed, appeared a stumbling block to this portion of the case), it was held that it was not necessarily by occupation, but might be by ownership.

In the case of a right to light and air arising through prescription, the time from which prescription is to be computed commences when the exterior walls with the window openings are completed and the building roofed in, although the window-sashes and the glass be not inserted, nor the interior finished for some time afterwards (*Collis* v. *Langher*, 1894, 3 Ch., 659). See also *Cooper* v. *Straker*, (40 Ch. D., 21), *Smith* v. *Baxter* (1900, 2 Ch., 138).

Enjoyment of Easement Suspended :—With regard to this an important decision has been given, showing that when a building is pulled down, and, clearly, the actual enjoyment of an easement of light has ceased, this does not operate as a loss of the easement. I think this so important that I give the headnote. The case is *The Ecclesiastical Commissioners for England* v. *Kino* (14 Ch. D., 213). See also *Easton* v. *Isted* (1903, 1 Ch., 405).

In this case it was held that where a building with ancient lights has been pulled down, and the actual enjoyment of that easement (though not the easement itself) has been in consequence suspended, the owner of the building can apply to the Court to restrain an erection which would interfere with the easement, when the Court is satisfied that he is about to restore the building with its ancient lights.

How the Easements may be Jeopardised.

By Alterations to Buildings :—The most important case bearing upon this subject is *Tapling* v. *Jones* (11 H. L. C., 290 : 34 L. T. C., p. 342 : 1865), which was fought up to the House of Lords, and heard there on February 17, 20, 21, and March 16, 1865, the action having been commenced in the Court of Common Pleas on February 24, 1858. This case decided that where there are ancient lights and other lights are added and an obstruction is raised against the added lights, which from their position cannot be obstructed without also obstructing the ancient lights, then such obstruction is illegal.

By Variations of the Plane at which Light is Admitted :—An important case is the *National Provincial Plate Glass Insurance Company* v. *The Prudential Assurance Company* (6 Ch. D., 757). Fry, J. said :—

"I hold in the present case that there has been for twenty years an access of light to the plaintiffs' dwelling-house through a portion of space over the defendants' tenement which reached the ground floor of the plaintiffs' house, and a portion of which if not the whole still reaches the same tenement of the plaintiffs' through an aperture.

I have said that it does not appear to me to be necessary to determine whether the aperture be or be not the same.

Further than that, if I am wrong in the conclusion that the aperture need not be the same I think in this case I ought to hold that as to so much of the new aperture as does let through the old light it ought to be deemed the same aperture."

Mr. Justice Neville, in giving judgment in the case of *Andrews* v. *Waite*, said :—

"That being so, the conclusion I have come to is this, that a substantial amount of light which comes in through the present skylight and the new windows on the first floor reaches the place where the old windows on the ground and first floors were situated both before and after the alterations of 1888 and 1895, and I think that the buildings proposed by the defendant would occasion a nuisance to the occupants of the house as it exists and to a house lighted as to its first and ground floors as the old house was both before and after the alterations."

By Ownership of both Properties being in the same Parties :—The case which I think is most important, and is to be relied on, is *Simper* v. *Foley* (2 J. & H., 535, 1862), where the dominant owner had an easement of light over some cottages for twenty years. The dominant owner was the tenant of the premises, and his landlord purchased the adjoining cottages in the year 1837 and sold them in the year 1860, the ownership being united from 1837 until such sale in 1860. It was in this case held that the easement was suspended and that it revived in 1860.

Enjoyment by Consent or Agreement :—It was held in the case of *Hyman* v. *Van Den Bergh* (1907, 2 Ch. 516) that a letter was a "consent or agreement expressly made or given" for the purpose of the enjoyment of the access and use of the light "by writing" within the meaning of sect. 3 of the Act, and that as there had not been enjoyment without such consent or agreement for the twenty years next before the commencement of the action, the plaintiff had not a right to the enjoyment of the light under the Act.

How the Easement may be Extinguished.

By Obstruction :—Undoubtedly the easiest way for a servient owner to rid himself of that most objectionable position of having to give his neighbour light without fee or reward is to block up the opening for twelve months. Now, should the dominant owner not discover this obstruction for twelve months, his ancient light is lost.

By Abandonment :—The case of *Smith* v. *Baxter* (Ch. D., 138 : 1900) is a useful guide of the modern trend of case law with regard to abandonment. The plaintiffs rebuilt their premises, but claimed an easement of ancient lights with respect to three windows of their new building which coincided with portions of three in the previous one. Such coincident area had in the case of two of the windows been boarded up, the remaining window had been partially covered with shelving, but the latter allowed a substantial amount of the light to pass into the building. Held with regard to the first two windows that the right had been abandoned, but that the right had not been so abandoned with reference to the third window. The Court made a declaration of plaintiffs' right instead of granting an injunction on the undertaking of the defendants to submit plans to the plaintiffs, the latter having liberty to apply thereafter for an injunction.

By Acts of Parliament :—The legislature frequently passes Acts which extinguish all easements and provide for compensation in lieu thereof to persons who prove that they sustain loss thereby. So that where an Act of Parliament sanctions the purchase of land by any public body or railway company, etc., for the purpose of erecting buildings,

the only remedy for an adjoining owner who has a prescriptive right is to bring an action for damages.

Loss of Air.

With regard to the loss of air *per se*, such loss is usually rather a difficult claim to substantiate. In recent years however, the Courts seem to incline to consider damage to air as more serious than heretofore, and in 1897 the House of Lords, in *Chastey & another* v. *Ackland* (L.T. 76, N.S. 430), intimated their intention of reversing the decision of the Court of Appeal, who held that there could be no right by prescription to air coming over the roofs of houses. The parties, however, came to a settlement, by which the appellants agreed to accept a sum of money in settlement, the respondents agreeing to pay the costs in the Lords and the Courts below. So that we must not lose sight of the effect of loss of air upon a dominant owner's property.

Some Points Decided in *Colls* v. *Home & Colonial Stores* and *Kine* v. *Jolly*.

1. The owner of the dominant tenement is not entitled to have the full amount of light which has gained access to the tenement by the ancient windows during the previous twenty years maintained without substantial diminution, unless such diminution amounts to a nuisance. See 4 infra.

2. It is open to doubt whether a claim for a special amount of light for a special purpose can be sustained in law at all, and in any case it must be shown that such special amount has been enjoyed for twenty years for the special purpose and to the knowledge of the servient owner (*Ambler* v. *Gordon*, 1905, 1 K.B. 417).

3. A person cannot by converting and using his house in a special way or for a special purpose, such as, *e.g.*, a photographic studio, throw a heavier burden on the servient tenement, except in such cases as come under 2 (supra), but since *Ambler* v. *Gordon* (ante), this point is very doubtful, nor is the dominant owner deprived of his rights because he has only used a well-lighted room for a purpose which needed little light.

4. The diminution of light necessary to support an action must be such that the diminution amounts to a nuisance.

The fact that there is less light than before will not support the action, but there must be a substantial deprivation of light so as to render the occupation of a dwelling-house uncomfortable according to the ordinary notions of mankind, or so as to interfere with the beneficial use and occupation of a shop or warehouse or other place of business.

5. In considering whether the amount of light obstructed is a nuisance, regard must be had to the light coming from other sources, but it is a question whether in doing so lights other than ancient lights should be taken into consideration.

6. The question of nuisance is one of fact for the jury or judge, as the case may be, and should be looked at broadly, having regard to all the circumstances.

7. Damages in very many cases will be an adequate remedy without an injunction.

One word of advice I would like to give to my professional brethren—to carefully study all dominant owners' interests before finishing one's sketch-plans, and thus probably saving our clients and ourselves a good deal of unnecessary worry and expense. Each case, of course, must be decided upon its own merits, and no hard-and-fast rules can be laid down, but with a little experience and a little common sense it does not take one very long to estimate fairly closely as to what one may or may not do with safety to one's clients. But to start a building, knowing full well that you are seriously damaging the adjoining owner's interests, is a most fatuous proceeding which cannot be too strongly condemned; but I regret to say it is not of infrequent occurrence.

No one knows better than my brother and myself how galling it is to have clients' buildings stopped because it is alleged that you are infringing some dominant easement, and many of us, from continually looking at light and air from this standpoint, are perhaps apt to take a rather one-sided view. If we were to put ourselves in the place of a purchaser who had bought a building solely because of its dominant light, which latter was essential for his special business purposes, we might perhaps be of opinion that the law as it stands does not even protect the dominant owner sufficiently.

On the other hand, the law now has freed us from the curse of petty interference by a "dog in the manger" adjoining owner, and the damage to an easement must constitute a legal nuisance to enable a dominant owner to take any successful action.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS.

IV.—Business Premises, Oxford-street.

The important building now being erected by Messrs. Mappin & Webb in Oxford-street was visited by a large body of members of the Architectural Association on Saturday, February 22 inst., the occasion of the fourth spring visit. In the absence of the architect, Mr. J. Belcher, A.R.A., his representative, Mr. J. J. Joass, received the party, and gave information upon the design, its details, and difficulties.

The salient feature of the scheme is the Pentelicon marble facing of the two fronts, Oxford and Winsley streets. This material is in common use at the present time. Past experience proves that it is admirably adapted to the atmosphere of London, although possessing a tendency to weather like stone. The current facilities for cleaning buildings, however, somewhat justify the introduction of marble for exterior purposes. Unlike other buildings in this district, the material is limited to one variety, and may be considered a structural rather than a decorative use of marble, although it is associated with steel and concrete. The design is excellent in detail and arrangement; the massing of parts, the maintenance of interest, and the expression of the purposes of the building are elements which produce a work of considerable character and charm. There is, however, a point which does not appeal to us—the introduction of the three-quarter columns in the ground and mezzanine stories, professing to undertake great works of support. Square piers with little or no decrease of glass area would perhaps have been more reasonable.

The plan is direct and fitting to the needs of the structure. Messrs. Mappin & Webb reserve the basement for packing, cleaning, and safe-storing purposes; the ground-floor for show-rooms, and the mezzanine over for board-room, manager's, secretary's, and clerks' offices.

The remaining upper floors are to be let off as offices, and will be approached from the side thoroughfare, Winsley-street.

All available floor and window space appears to have been secured in the respective departments. In gaining additional accommodation below the public footways, special concrete retaining walls are erected, whilst the drains, in order to enter the sewer, are benched up on the east party wall to allow of greater height to the basement story.

The plaster and marble work of the show-rooms are interesting, and the display of specially designed windows and show-cases gives an admirable display to the well-known productions of the firm.

The London Building Act lays a heavy hand upon the work. The customary and extreme demands in thickness of walls, fire provision, and the like, are matters of serious concern to all who build in the metropolis.

Difficulties in quarrying and the consequent delivery of marble have played sad havoc with the progress of the building operations; but Messrs. Godson & Sons, the contractors for the work, have advanced the interiors to their utmost limit, and have produced workmanship of excellent quality.

THE SURVEYORS' INSTITUTION.

An ordinary general meeting of the Surveyors' Institution was held on Monday at No. 12, Great George-street, Westminster, S.W., Mr. T. T. Wainwright presiding, when Mr. W. G. S. Rolleston read a paper on "The Small Holdings and Allotments (England) Act, 1907." He first referred to the principal measures which previously dealt with small holdings and allotments, for the recent Act of 1907 incorporates the provisions of those measures which were not expressly repeated or inconsistent with it; and he then dealt at considerable length with the provisions of the new Act. On taking a general survey of the provisions of the Act we found, he said, many features which were open to political criticism, such, for instance, as the over-riding of the County Councils—those powerful bodies elected on the widest and most democratic franchise yet known to our Constitution—by Commissioners appointed by the department in charge of its administration. We could but regret also the exclusion of all provision for sale by the Councils to those willing and able to purchase their holdings; for while perhaps not believing as fully in the wonders effected by the magic of ownership as do its most enthusiastic advocates, we must recognise that it was a powerful incentive to the more thrifty and enterprising of our countrymen. Indeed we knew that by a little timely help one County Council at least had successfully made use of the Act of 1892, and has substantially increased the number of small occupying owners within its area. The omission of any power to advance moneys to suitable persons for equipment of their holdings must also, he thought, help to retard its operation. Again, the compulsory power given to the authority to renew practically in perpetuity their lease of land taken from an unwilling owner, without any option on his part, thus possibly compelling him to part with the active possession of his land for ever, coupled with the uncertainty whether the lease might be renewed or not at the end of any term, and yet denying him the advantages which attached to a rent charge in perpetuity or to a lease for a prolonged period of years, struck one as inequitable and open to serious objection. They could hardly, as practical men, expect that the Act would bring about the transformation in the character of rural England that was looked for by its most enthusiastic advocates, or would bring unfailing happiness and prosperity to all and everyone who might be attracted by it to the occupation of the soil, or that unlimited areas of land were only waiting and hungering for cultivation by the small holder in order that they might blossom as the rose. Nevertheless, members of the Institution would welcome it, if its working should tend in any way to retain the present rural population upon the soil and retard the constant flow of rural labour to our large centres of industry, by offering greater opportunities for advancement in life to the agricultural classes. Surveyors would do all that lay in their power to give the Act the fullest and fairest trial, and to ensure that its provisions were carried out on those reasonable, equitable, and economic lines, which he believed alone were likely to secure for it any substantial measure of permanent and abiding success. The ultimate power and the entire responsibility for the administration of the Act were in the hands of the Board of Agriculture; it was they who would spur on the unwilling or recalcitrant Councils, and in the ultimate event in cases of default would administer the Act themselves: it was they who could curb and restrain the over-hasty or too arbitrary authority; it was they who

could prevent injustice or inequity to individuals or to the general body of ratepayers; and it was they who could virtually determine the policy as well as the entire scope and character of its operations.

A discussion followed.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Mr. H. P. Harris, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 7,925*l.* for paving works, and Woolwich Borough Council 3,000*l.* for purchase of electrical apparatus and wiring consumers' premises.

Selected List of Contractors.—The Education Committee recommended, and it was agreed:—

That the name of Messrs. S. Wiles & Sons be added to the list of contractors to be invited to tender for new schools, enlargements, structural alterations, repairs to buildings, cleaning and painting, for works not exceeding 5,000*l.* in value.

That the name of Mr. J. Christie be added to the list of contractors to be invited to tender for repairs to buildings, cleaning, and painting.

That Messrs. J. Shelbourne & Co. be invited to tender for new schools and enlargements not exceeding 10,000*l.* in value, structural alterations, repairs to buildings, cleaning, and painting.

Fire Hydrants.—It was agreed that the supplemental estimate of expenditure on maintenance account of 400*l.*, submitted by the Finance Committee, in respect of the supply and fixing of new fire hydrants and the repair of existing hydrants, etc., be approved.

Water Supply for Fire Purposes.—It was agreed that the suggestion of the Metropolitan Water Board to submit to arbitration the question of the allocation of the cost of certain water main extensions, connexions, or improvements considered necessary by the Council for the purpose of affording an adequate supply of water in case of fire, be agreed to.

Fire Brigade Work Executed in the Architect's Department during 1907.—The Fire Brigade Committee reported as follows:—"We have had before us a report by the architect as to the work executed in his department during 1907 in connexion with the erection of new fire-stations and the alteration, repair, and maintenance of existing stations. During the year the erection of five new stations and the substantial enlargement of one other station have been completed, and the erection of two new stations has been considerably advanced. Progress has also been made with the drawings of four new stations, and of the alteration of three existing stations. The cost during the past year of maintaining the fire-stations in the brigade was 2,493*l.*, the aggregate rental value of the stations being 45,054*l.*, while eight years ago the cost of maintenance was 5,035*l.*, and the rental value 26,672*l.* . . ."

Tramways.—It was agreed that the estimate of expenditure on capital account of 1,250*l.*, submitted by the Finance Committee, in respect of the purchase by the Council of the tramways in High-street, Plumstead, belonging to the Bexley Urban District Council, be approved.

Improvements.—It was agreed:—

That a payment of 1,177*l.* 4s. 5d. to the Wandsworth Metropolitan Borough Council on account of the Council's promised contributions towards the cost of widening York-road, Wandsworth, be sanctioned.

That a payment of 261*l.* 19s. to the Wandsworth Metropolitan Borough Council on account of the Council's promised contribution towards the cost of widening High-street, Clapham, at Nos. 84 to 96, be sanctioned.

The Council, having transacted other business, adjourned.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Dulwich.†—A house on the northern side of Woodwarde-road, Dulwich, to abut also upon the eastern side of Calton-road, and with a projecting porch (Mr. W. J. Almond for Dr. Parrott).—Consent.

Deptford.—A deviation from the plans approved for the erection of an iron and glass shelter at the New Cross Empire, New Cross-road, Deptford, so far as relates to an alternation in the construction of the cantilevers supporting the shelter (Messrs. F. Matcham & Co.).—Consent.

Clapham.—Buildings on the western side of Lyham-road, Brixton (Messrs. Dartnell & Banks for Mrs. E. Gray).—Refused.

Limehouse.—A one-story shop in front of No. 40, East India Dock-road, Limehouse (Mr. C. Dunch for Mr. A. F Smith).—Refused.

Width of Way and Lines of Frontage.

Haggerston.—The retention of a water-closet building at No. 20, Regent's-row, Haggerston (Messrs. Lovegrove & Papworth for Messrs. W. & C. Marshall).—Consent.

Hampstead.†—A motor-house at Oak Hill Lodge, Oak Hill-park, Hampstead, abutting upon the footway leading from Frognal-rise to Redington-road (Mr. P. Morley Horder).—Consent.

Marylebone, East.—The retention of a projecting wooden pediment at No. 52, Oxford-street, St. Marylebone (Messrs. R. Creese Harrison & Son for the London Joint Stock Bank, Ltd.).—Consent.

Bermondsey.—A parochial hall on the southern side of Alfred-street, Bermondsey (Messrs. E. Crosse & Co. for the Building Committee of St. Luke's Church).—Refused.

Lines of Frontage and Construction.

Battersea.—Two showcases on the forecourt of No. 73, Battersea-rise, Battersea, and the erection of a wood and glass studio on the eastern flank of such premises (Mr. H. Folkard).—Consent.

City of London.—The construction of an external iron gangway over the public way of Knightrider-court, Knightrider-street, St. Paul's-churchyard, to connect two blocks of Messrs. Cook, Son, & Co.'s premises (Messrs. Cook, Son, & Co.).—Consent.

Width of Way and Construction.

St. Pancras, West.—The retention of three wooden sheds of a temporary character in a yard on the southern side of Wybert-street, St. Pancras (Messrs. C. Mellier & Co.).—Consent.

Formation of Street.

Wandsworth.—The erection of a stable building upon a plot of land approached by a passage-way leading out of the north-eastern side of Himley-road, Tooting (Messrs. H. Wakeford & Sons for Mr. W. Watson).—Consent.

Alteration of Buildings.

City of London.—An addition at the first-floor level of Temple House, Tallis-street, City (Messrs. Gordon & Gunton for Sir Horace Marshall & Son).—Consent.

Hackney, South.—A modification of the provisions of sects. 74 and 77 of the said Act, so far as relates to the uniting of Nos. 14 and 16, Chatsworth-road, Clapham Park (Messrs. H. Dearsly & Son for Mr. A. L. Rayner).—Consent.

Hackney, South.—A modification of the provisions of sects. 74 and 77 of the Act, so far as relates to the uniting of Nos. 21 and 23, Chatsworth-road, Clapton Park (Messrs. H. Dearsly & Son for Messrs. Bowman & Co.).—Consent.

Westminster.—A studio on the roof of No. 124, Victoria-street, Westminster (Messrs. Griffin & Woollard for Mr. J. B. Martin).—Consent.

Space at Rear and Alteration of Building.

Paddington, South.—Uniting of Nos. 46 and 48, St. Petersburg-place, Paddington, an alteration in the internal arrangements of the premises and the erection of an additional story to the existing portion at the rear (Mr. S. Ward for Mrs. S. Ward).—Refused.

The recommendations marked † are contrary to the views of the local authorities concerned.

DISTRICT SURVEYORS' ASSOCIATION DINNER.

THE members dined together on Thursday, the 20th inst., at the Criterion Restaurant, Piccadilly Circus, W. The chair was occupied by the President, Mr. Henry Lovegrove, with Mr. W. Grellier, Treasurer, and Mr. Bernard Dicksee, Hon. Secretary, in the vice-chairs. Past-Presidents Messrs. A. Payne, T. H. Watson, E. Dru Drury, J. D. Mathews, and F. Wallen attended with many members.

The guests were Messrs. J. Goldsmith, Chairman of the London County Council Building Act Committee; Mr. Seager Berry, late Solicitor to the Council; D. Andrew, J. W. Godfrey, and others, while the Borough Councils were represented by the Mayor of Holborn (Mr. Lacey W. Ridge) and the Mayor of West Ham (Mr. J. R. Moore-Smith).

The usual toasts were honoured, songs and recitations were given, Mr. G. J. Hall, of Beckenham, presiding at the piano.

The Vice-President, Mr. J. Clarkson, Messrs. W. E. Riley and W. Tanner, Architect and Solicitor to the Council, and others were unable to attend.

Illustrations.

COMPETITION DESIGN FOR LONDON COUNTY HALL.

WE give this week a perspective drawing of the design by Messrs. Russell & Cooper; a drawing which of course was not submitted in the competition, from which perspectives were excluded; but which has been made since, and shows well the grandiose quality of this design, at least as to the main building. As to the central feature there may be other opinions. Messrs. Russell & Cooper's plan, which we consider one of the best submitted, we shall give, along with others of their geometrical drawings, in another issue.

We give also the principal elevation and plans of the design by Mr. J. B. Fulton. The author states that he placed the principal floor high because it was more central to all the departments. "All the apartments either above or below adjoin the principal floor as desired. I placed the Members' Terrace above the principal floor so that it could not be overlooked. The Kitchen and Dining-room I placed outside the main building. The average width of my rooms is about 20 ft."

WESTMINSTER CITY COUNCIL.

AT the fortnightly sitting of the Westminster City Council on Thursday last week the following, amongst other matters, were dealt with:—

Street Works.—It was agreed to carry out street repairs in Castle-street, Westbourne-street, Green-street, and Warwick-square at an estimated cost of 251*l.* It was further resolved to carry out macadam repairs in Grosvenor-road and Eccleston-square, kerb works in Dover-street, Hindon-street, Great Peter-street, and Eccleston-square at an estimated cost of 453*l.*

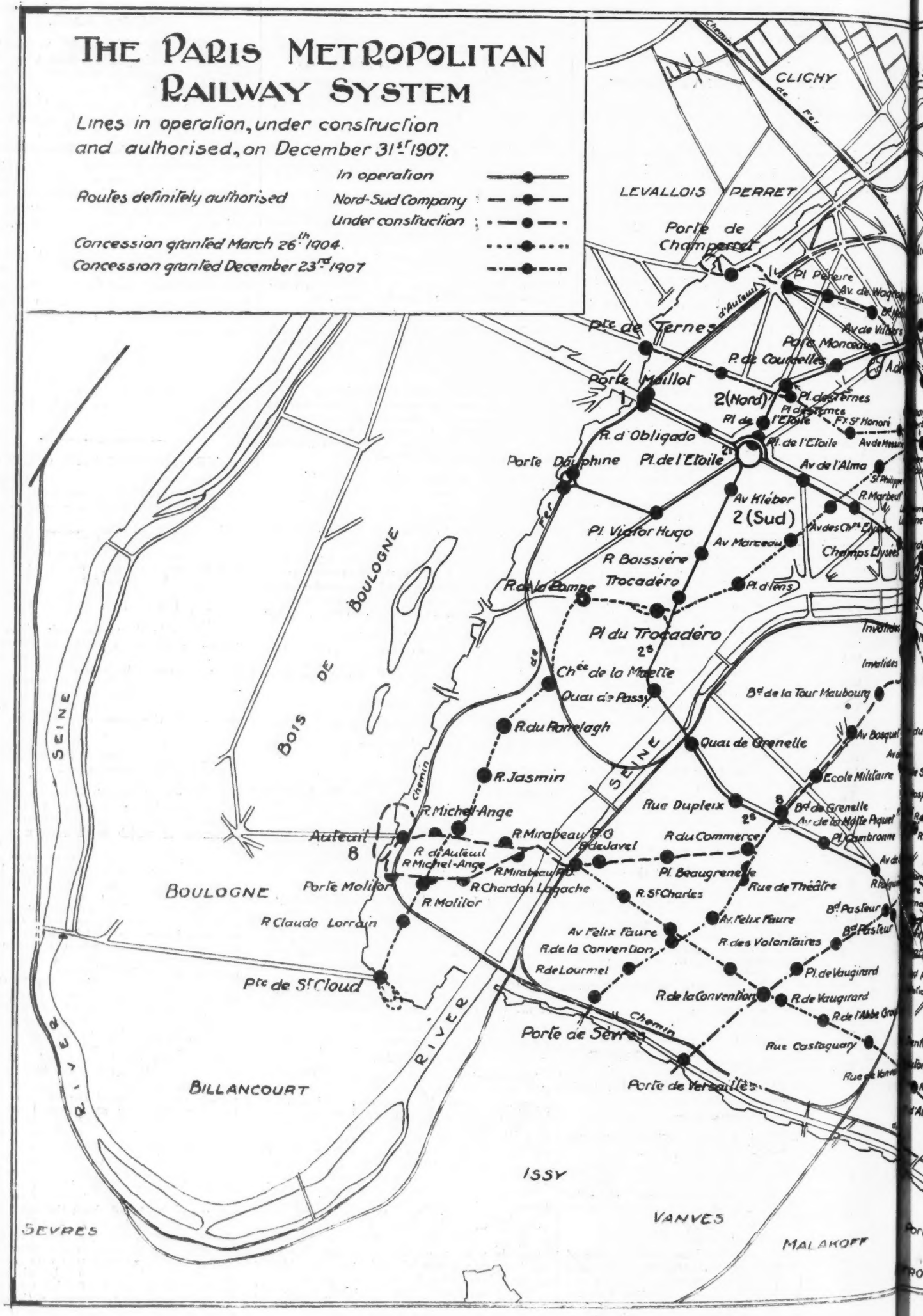
Considerable discussion took place over a motion by Mr. Flint to rescind the resolution carried at the last sitting to pave the whole of Grosvenor-square with wood blocks.

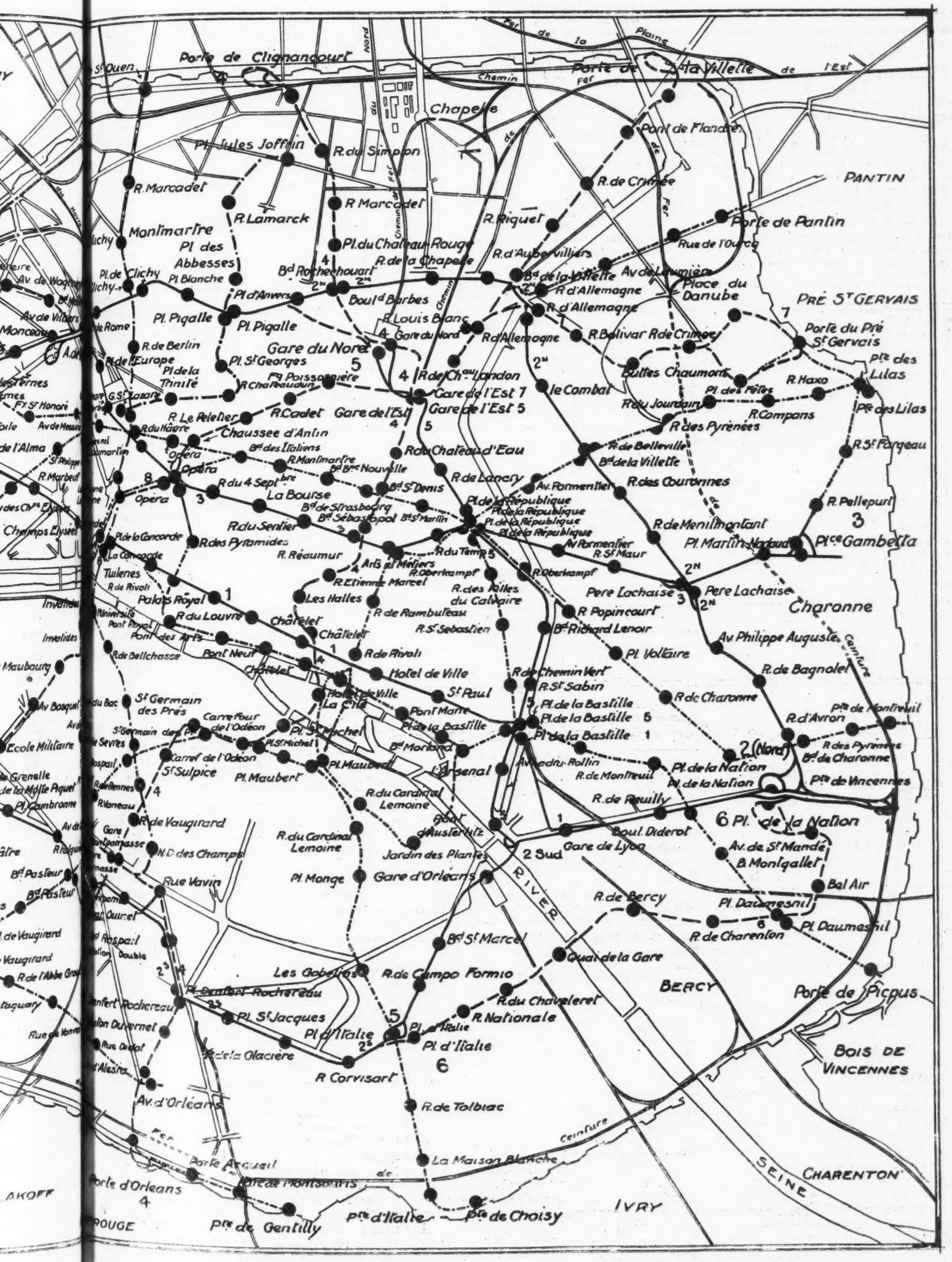
Mr. Everitt said that every member of the Highways Committee who viewed the square was in favour of wood pavement, which would cost about the same as macadam, and be cheaper to keep clean.

Eventually it was decided to adjourn the matter until the views of the residents in the square had been ascertained.

Drainage Plans.—Amongst the drainage plans submitted were those for the drainage of Messrs. Gorringe's premises at the corner of Buckingham Palace-road and Brewer-street, the basement of which is at such a level that, although in ordinary circumstances the premises can be drained by gravitation with the existing sewer, the premises would be liable to be flooded in times of storm. It was agreed to approve the plans conditionally provided that the owners of the premises undertook not to hold the Council liable in the event of the premises being flooded with water. A similar recommendation was adopted in the case of the drainage plans for the west block of Caxton House, Tothill-street.

Ancient Lights.—On December 19, the Housing Committee reported on the subject of the proposals of the owners of certain properties in the rear of No. 7, Ingestre-place and the St. James's Dwellings to carry out alterations to party walls and to erect new buildings there, and that the usual party-wall notice, under the London Building Act, 1894, had been served on the Council. In the course of the report, they expressed the opinion that were the new buildings as proposed erected, not only would the light and air now enjoyed by the tenants of No. 7, Ingestre-place be materially affected, but also the light of the adjoining premises, the St. James's Dwellings. They recommended that the Council should dissent from the whole of the proposals, and that "ancient lights" boards should be conspicuously displayed about the dwellings. The Council adopted the report, and Mr. Lockwood, the surveyor to the owners of the properties on which the alterations are proposed to be made, was communicated with accordingly, and the "ancient lights" boards have been fixed. Arising out of a further communication by Mr. Lockwood to appoint a third surveyor to settle differences relating to party walls, the Committee had carefully considered the matter, and were of opinion that, so far as party walls were concerned, no objection could be raised to the proposals.


THE PARIS METROPOLITAN RAILWAY SYSTEM
Lines in operation, under construction and authorised, on December 31st 1907.
In operation
Routes definitely authorised
Nord-Sud Company
Under construction
Concession granted March 26th 1904.
Concession granted December 23rd 1907
CLICHY
LEVALLOIS PERRET
Porte de Champerret
Pl. Pereire
Av. de Wagram
Ptе de Ternes
Porte Maillot
Porte Monceau
P. de Courcelles
2 (Nord)
Pl. des Ternes
Pl. de l'Etoile
R. d'Obligado
Porte Dauphine
Pl. de l'Etoile
Av. de l'Alma
Av. Kléber
2 (Sud)
Pl. Victor Hugo
Av. Marceau
R. Boissière
Trocadéro
Champs Elysées
R. de la Pompe
Pl. d'Iéna
Pl. du Trocadéro
Invalides
Chée de la Muette
Quai de Passy
Bd de la Tour Maubourg
R. du Ranelagh
Quai de Grenelle
Av. Bosquet
R. Jasmin
Ecole Militaire
R. Michel-Ange
Rue Dupleix
Bd de Grenelle
Auteuil
R. Mirabeau
R. du Commerce
R. de Javel
Pl. Cambronne
R. d'Auteuil
Pl. Beaugrenelle
Rue de Théâtre
BOULOGNE
Porte Molitor
R. Chardon Lagache
R. St Charles
R. Molitor
Bd Pasteur
R. Claude Lorrain
Av. Félix Faure
R. de la Convention
R. des Volontaires
R. de Lourmel
Pl. de Vaugirard
Ptе de St Cloud
Porte de Sèvres
Rue Castagnary
Porte de Versailles
BILLANCOURT
ISSY
VANVES
SEVRES
MALAKOFF
SEINE
RIVER
BOIS DE
Chemin


Porte de Clignancourt
St Ouen
Chemin de Fer du Nord
Chapelle
Fer de la Plaine
Porte de la Villette
Chemin de Fer de l'Est
Pont de Flandre
PANTIN
Pl. Jules Joffrin
R. du Simplon
R. Marcadet
R. Lamarck
R Marcadet
R. Riquet
R. de Crimée
Porte de Pantin
Rue de l'Ourcq
Montmartre
Pl. des Abbesses
Pl. de Clichy
Pl. Blanche
Pl. du Chateau Rouge
R. de la Chapelle
R. d'Aubervilliers
Bd Rochechouart
Bd de la Villette
Av de Laumière
Place du Danube
PRÉ ST GERVAIS
Pl. d'Anvers
Boul d Barbes
R. d'Allemagne
Pl. Pigalle
R. Louis Blanc
R. Bolivar
R de Crimée
Porte du Pré St Gervais
R. de Berlin
Pl. de l'Europe
Pl. St Georges
Gare du Nord
Gare du Nord
Pl de la Trinité
Fg Poissonnière
R. de Ch.au London
Buttes Chaumont
R. Haxo
Ptte des Lilas
R. Cadet
Gare de l'Est
Gare de l'Est
le Combat
R du Jourdain
Pl. des Fêtes
R. Compans
R. des Pyrénées
Chaussee d'Antin
R. du Chateau d'Eau
R. de Belleville
Bd de la Villette
R. St Fargeau
Bds des Italiens
R. Montmartre
Bd Bne Nouvelle
Opera
R. du 4 Sept
La Bourse
Bd St Denis
R. de Lancry
Av. Parmentier
R. des Couronnes
R. Pelleport
Bd de Strasbourg
Bd Sébastopol
Bd St Martin
Pl. de la République
R. du Sentier
R. de Menilmontant
Pl. Marlin Nadaud
Ptte Gambetta
Pl de la Concorde
R. des Pyramides
R. Réaumur
R. du Temple
Av. Parmentier
R. St Maur
Arts et Métiers
R. Oberkampf
R. Etienne Marcel
Tuileries
Les Halles
R. des Folies du Calvaire
Pere Lachaise
Pere Lachaise
Charonne
Palais Royal
R de Rivoli
R. du Louvre
Châtelet
R de Rambuteau
R. Popincourt
R. St Sebastien
Bd Richard Lenoir
Av Philippe Auguste
Pont Royal
Pont des Arts
Pont Neuf
R de Rivoli
Pl. Voltaire
R. de Bagnolet
R de Bellechasse
Hotel de Ville
St Paul
R. de Chemin Vert
R. St Sabin
R de Charonne
Pte de Montreuil
St Germain des Prés
Carrefour de l'Odéon
Pl. St Michel
Pont Marie
Pl de la Bastille
Pl de la Bastille
R. d'Avron
R des Pyrénées
Bd de Charonne
Ecole Militaire
Carref de l'Odéon
St Sulpice
Pl. Maubert
Bd Morland
Arsenal
Av Ledru-Rollin
Pl. de la Nation
2 (Nord)
R. de Montreuil
Pte de Vincennes
R. du Cardinal Lemoine
R. de Vaugirard
Gare d'Austerlitz
R. de Reuilly
6 Pl. de la Nation
Gare de Lyon
Boul. Diderot
Av. de St Mandé
Bd Montgallet
N.D des Champs
Jardin des Plantes
2 Sud
Rue Vavin
Pl. Monge
Gare d'Orleans
RIVER
Bal Air
R. de Bercy
Pl. Daumesnil
R. de Charenton
Bd St Marcel
Quai de la Gare
Les Gobelins
R. de Campo Formio
BERCY
Porte de Picpus
R. du Chevaleret
R. Nationale
Pl. St Jacques
Pl d'Italie
Pl. d'Italie
Pl. d'Italie
R. de la Glaciere
R. Corvisart
BOIS DE VINCENNES
Av. d'Orleans
R. de Tolbiac
Ceinture
La Maison Blanche
SEINE
CHARENTON
Porte d'Orleans
Pte de Gentilly
Pte d'Italie
Pte de Choisy
IVRY

THE LONDON MASTER BUILDERS' ASSOCIATION:

ANNUAL DINNER.

THE annual dinner of the London Master Builders' Association was held on Wednesday last week in the Carpenters' Hall, London Wall, E.C., Mr. F. L. Dove, L.C.C., President, in the chair. There were also present Sir Melvill Beachcroft, Chairman of the Metropolitan Water Board; Mr. H. P. Harris, J.P., Chairman of the London County Council; Lt.-Col. A. C. Preston, V.D., Master of the Carpenters' Company; Mr. Walter Cave, President of the Architectural Association; Mr. Joseph Bell, President of the Institute of Builders; Mr. C. H. Barnsley, President of the National Federation; Mr. W. F. Wallis, President of the Southern Counties Federation; Mr. F. Higgs, President Builders' Benevolent Institution; Mr. G. L. Gomme, Clerk to the London County Council; Mr. J. W. Lorden, J.P., Mayor of Wandsworth; and Messrs. T. Bamforth, H. A. Bartlett, W. J. Burrows, F. Bush, F. Borcham, R. D. Bartlett, R. G. Bare, E. J. Brown, A. B. H. Colls, B. Carter, T. Costigan (secretary), W. Clarkson, W. Collins, G. Corderoy, J. E. Drower, F. J. Dove, R. J. Ford, F. W. Foster, W. Foster, R. P. Gleed, J. Gunton, B. J. Grover, E. A. Gruning, J. S. Gibson, B. I. Greenwood, T. Gregory, W. M. Hill, E. J. Hill, R. J. Halliday, G. Harvey, G. S. Harrison, A. A. Hudson, E. B. I'Anson, A. R. Jemmett, W. Lawrance, J. H. Lepper, F. M. May, F. G. Minter, F. W. Moss, F. W. Marks, E. Munson, L. J. Maton, C. Mabey, F. G. Neall, J. F. Parker, J. Paxton, C. R. Parker, C. Parker, J. Randall, F. G. Rice, E. A. Rickards, T. F. Rider, R. M. Roe, E. S. Rider, A. Ritchie, G. A. G. Robertson, L. Solomon, W. Spooner, G. Stegmann, A. Stoner, A. Thom, E. G. Verity, F. J. Walton, C. Woodward, A. G. White, W. T. Walker, B. C. Wotton, J. Young, and others.

The loyal toasts having been proposed by the Chairman and honoured,

Mr. T. F. Rider, Past-President of the Association, proposed the toast of "The Guardian Angels of London" (the Livery Companies and Municipal Bodies), coupled with the names of Mr. H. P. Harris, J.P., and Lt.-Col. A. C. Preston, V.D. In the course of his remarks he said he was delighted to see their friend and Secretary, Mr. Costigan, with them once more, and he hoped he was completely restored to health. The City Guilds might be called the trade unions of the past, and they exercised an influence over trade. No man could carry on his trade in times gone by unless he belonged to a City Guild. So far as the City Guilds were concerned, they were noted for their help, generosity, and hospitality. It was generally known what they had done for technical education. He believed that during the last twenty-five years they had spent no less than one and a quarter millions on technical education alone. As to the County Council, it had done a great deal for London, and one of their good works was in regard to parks and open spaces.

Mr. H. P. Harris said he had been rather afraid that some awkward conundrums might be asked him that evening. For instance, the prospects of the Works Department and the ring of contractors—which he believed was more or less of a figment. And they might want to know about the Building Act and who was to build the County Hall. He was sure that the Council, in the discharge of its duties, desired to have the co-operation of those who were very much concerned in the discharge of those duties.

Lt.-Col. Preston, V.D., also replied, and remarked that a good many people did not understand what the City Guilds were or what their work was. If they saw the work of the City Guilds they would alter their opinions.

Mr. C. H. Barnsley, President of the National Federation of Building Trades' Employers, then proposed "The Founders and Past-Masters." He said that the success and importance of the Association was due to the enthusiasm and courage of those who many years ago were responsible for its formation. They were men who were willing to make sacrifices for the benefit of those who, in futurity, would find their interests centred in the great industry of building. The founders of the Association were men of foresight. Their visions were not narrow, and they anticipated events, and they saw that it was better to have prevention than cure. They saw that much was to be gained by being banded together so that the voice of united authority might have its influence, not only in surveying the interest of the building trade, which was so often assailed by the employees' union, but that their influence might be employed in combatting legislation calculated to affect the liberties and privileges of contractors. Many of those men had passed away, but their labours followed them. He was glad to say that they had one of those men with them that night, *i.e.*, Mr. F. J. Dove, the father of their President, and they thought with gratitude and pride of him and other founders of the Association. The history of the Association was a history of progress, and although there had been difficulties to face he was glad to say that there were fewer disputes between masters and men to-day, and strikes were a matter of the past. The old separate and scattered local associations were now united, and formed an influence which was felt not only amongst the trade unions, but in Parliament too. They had not realised the ideal of the founders, but, inspired, as they were, by their enthusiasm, he believed there was a great future before the Association and the Federation.

Mr. F. J. Dove, who responded, said that the object of forming the Association was to resist the attacks made upon them by dissatisfied workmen. They passed through very troublous times, but now the Association was in a more flourishing condition than it had ever been. That was due in a great measure to the Conciliation Boards which had been created, which had done such great service, and which had enabled employers to go on with their business in peace. Added to that, the Association had secured a most admirable secretary in Mr. Costigan, who had been very unwell lately. Now that he was back again he thought they should propose his health.

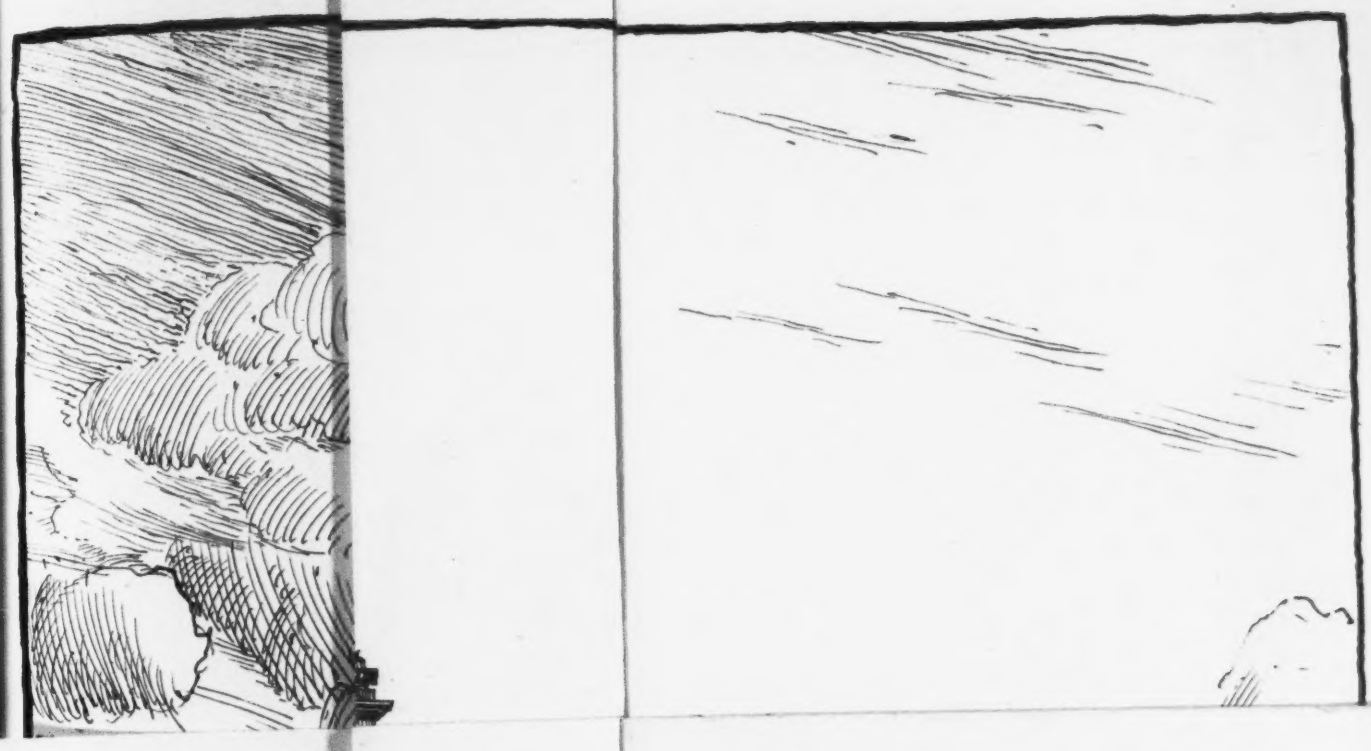
The Chairman said he thought they would all desire to act on the suggestion, and he had the greatest pleasure in proposing Mr. Costigan's health.

The toast having been honoured, and Mr. Costigan having briefly and suitably responded,

Mr. J. W. Lorden, J.P., proposed "Our Guides and Philosophers," *i.e.*, architects and surveyors. He said that most builders owe a great debt to architects and surveyors, but sometimes the debt was felt to be mutual, for architects could not very well do without builders. He supposed that architecture was a most fascinating profession, and it must be a great pleasure for an architect to design a beautiful building and then to see it carried into effect. The old idea of the possibility of a man being a builder, an architect, and a surveyor, had, he was glad to say, gone by, and it was impossible for one man nowadays to carry out the three grades of building work. As to the present times, they were bad for the building trade, and there was very little money being spent in the building line, but there was reason to hope for an improvement soon. There was one matter to which he might refer, and that was as to the divided responsibility in regard to buildings. On many of the large buildings being erected the chief contractor was a sort of pantechnicon-van, in which all sorts and conditions of small contractors worked. It would be all right if they worked under the chief contractor, but they were independent of him, and that was not to the benefit and advantage of many buildings. The practice must result in a loss of enthusiasm and the best effort of a man when he had to put up only the brickwork of a building, and not, perhaps, all that. Better work would be done if the builder was the builder from start to finish and had control over his work. Architects did help builders to get work at a reasonable price; they did not wish for work to be done under cost price, though that was the tendency of the day, and they did not wish to get extra special work done at an inadequate price. As to surveyors, they tried to smooth away many of the difficulties that occurred. Builders liked to work where there was a surveyor engaged, and they found that in late years on every job of any size, and many small jobs too, a surveyor was engaged who took out the quantities and adjusted the accounts. He might add that a builder took almost as much pride, perhaps, as the architect in looking at a building which he had put up.

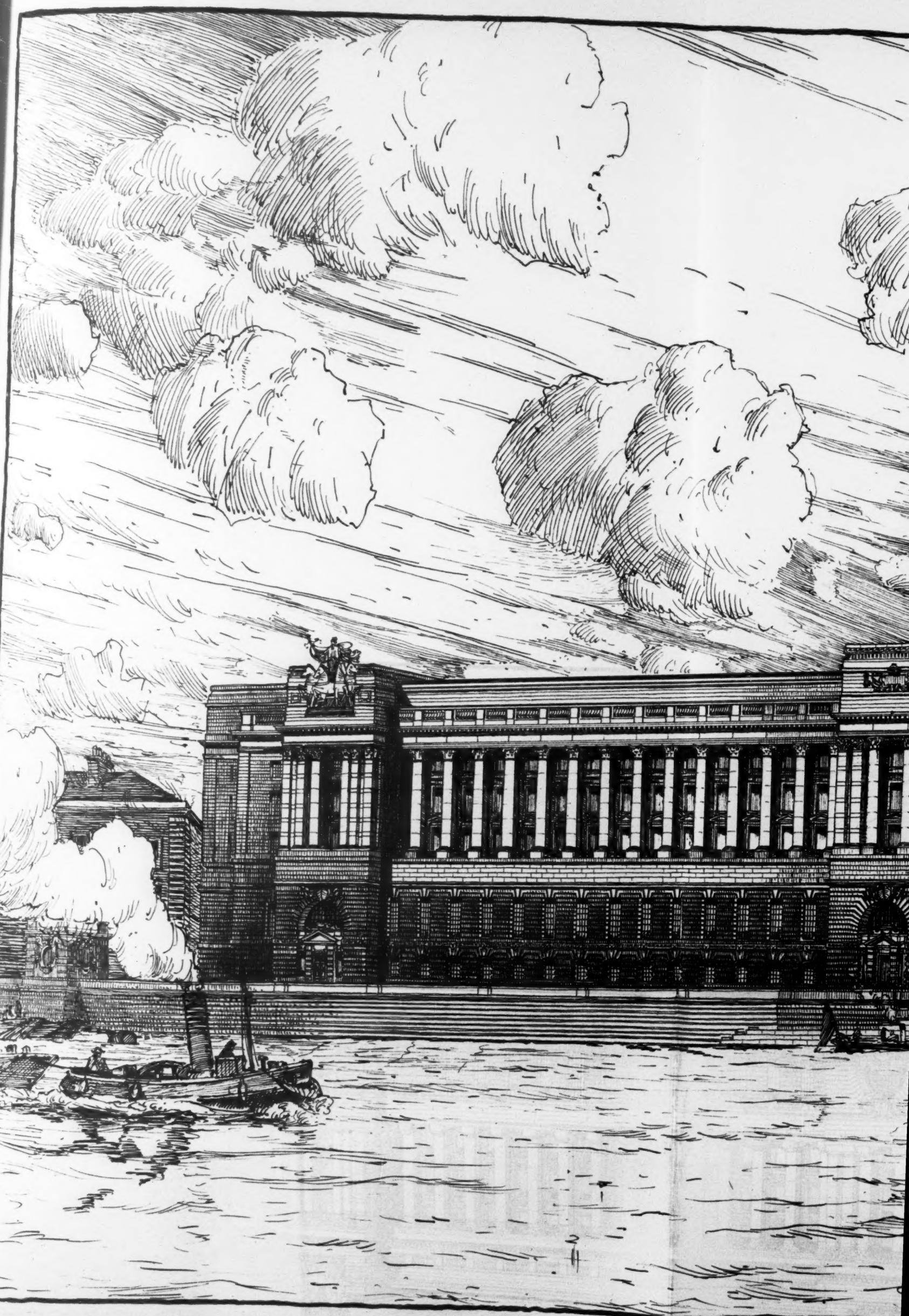
Mr. Walter Cave, who replied for the architects, said he should like to say a few words about the Architectural Association, of which body he had the honour of being President. The Association was the most important educating body for architects in England, and the education of architects or builders was the most important part of each profession. They had all recently heard of the success of Mr. Knott in the County Hall competition, and he was proud to say that the successful competitor had only recently left the Association's schools. Mr. Knott was an instance of a young man who had come to the front very largely on account of the excellent training he had had, and they would agree with him (the speaker) that the training of an architect was not complete if it took place only within the walls of a studio. All important works, he believed, which had been carried out in this country had been done by men who had had more than that training; they had been through either the clerks of works' duties or through the builders' yards, and it was to that latter part of their training that he attached the greatest importance; it not only made a man intimate with the technicalities of his profession, but it brought him in touch with the builders and contractors who would ultimately carry out his own designs, and he got to know the methods on which they worked, and, what was most important, he got to trust them. It was only on these lines that an architect could really get behind the ordinary conditions of building and get to know how the work was done, and when he knew this and trusted his builder the best results were obtained. There should be a good understanding between architects and builders, otherwise our buildings would not be worthy monuments of our generation. The new County Hall, the most important architectural work since the Law Courts, would be in the hands of a young man, and from what he (the speaker) knew of him and his work in the Association schools that building would be carried out successfully.

Mr. A. Stoner, F.S.I., replied for the surveyors, and said that times had greatly changed since builders were looked upon with suspicion, and he believed they were now regarded as an honourable body of men desirous of giving value for money and of erecting good buildings. The position of surveyors, too, had improved, for the time was when they were thought of as policemen. As to quantity surveyors, they ought always to be employed on a building, and he was told that there were many towns in England where the Master Builders' Associations would not tender for a job over 300*l.* in value without quantities, but in London there were many thousands of pounds' worth of work done without a quantity surveyor, and he thought it was the fault of builders that that should be the case. Quantity surveyors believed that builders made a mistake in doing this. He was glad to be able to say that architects, surveyors, and builders worked more together than they used to do. He remembered the time when there was scarcely any job of importance erected which did not occasion something of a contest. One of the troubles

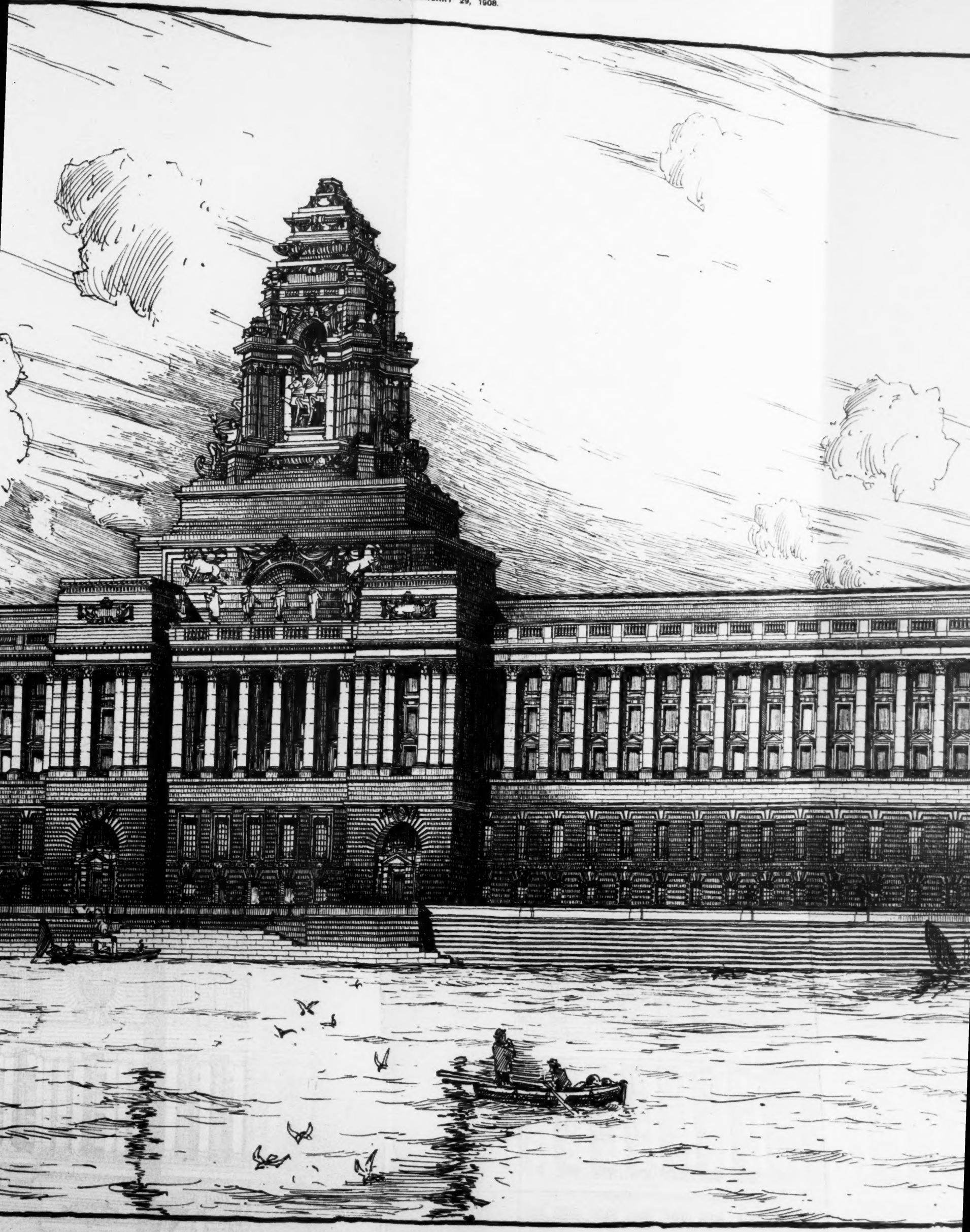


and he hoped the master builder would continue to do so, while the architect, if he was to do justice to his art, would be able to give all his thought to what to him was the chief part of his work, *i.e.*, the idea underlying all good building. The intimate relation between the master builder and the mechanics and better-class labourers were now anxious that their boys should be brought up to a trade; and, speaking in the presence of two most distinguished members of the London County Council, he said that if the County Councils through-

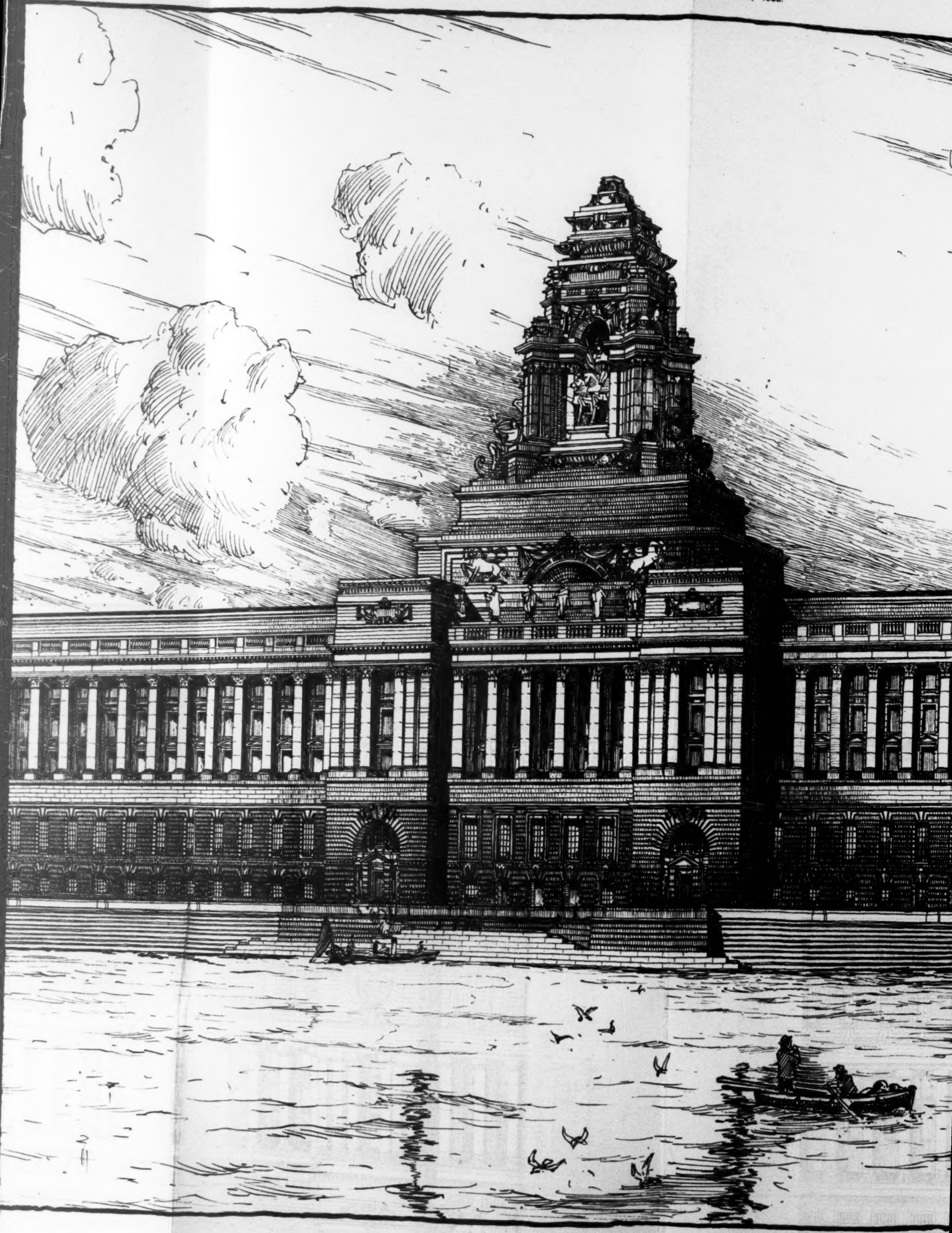
portance as to form the subject of a separate Bill under the title of the London Buildings Acts, 1894-1905 (Amendment Act) Act, 1908, and it is submitted that any alterations in the building law should be made and found only in measures whose titles disclose that they are amendments to the London Building Acts.



LONDON CO



LONDON COUNTY HALL COMPETITION.—Design by Messrs. S. B. Russell & Edwin Cooper, FF.R.I.B.A.



LONDON COUNTY HALL COMPETITION.—Design by Messrs. S. B. Russell & Edwin Cooper,

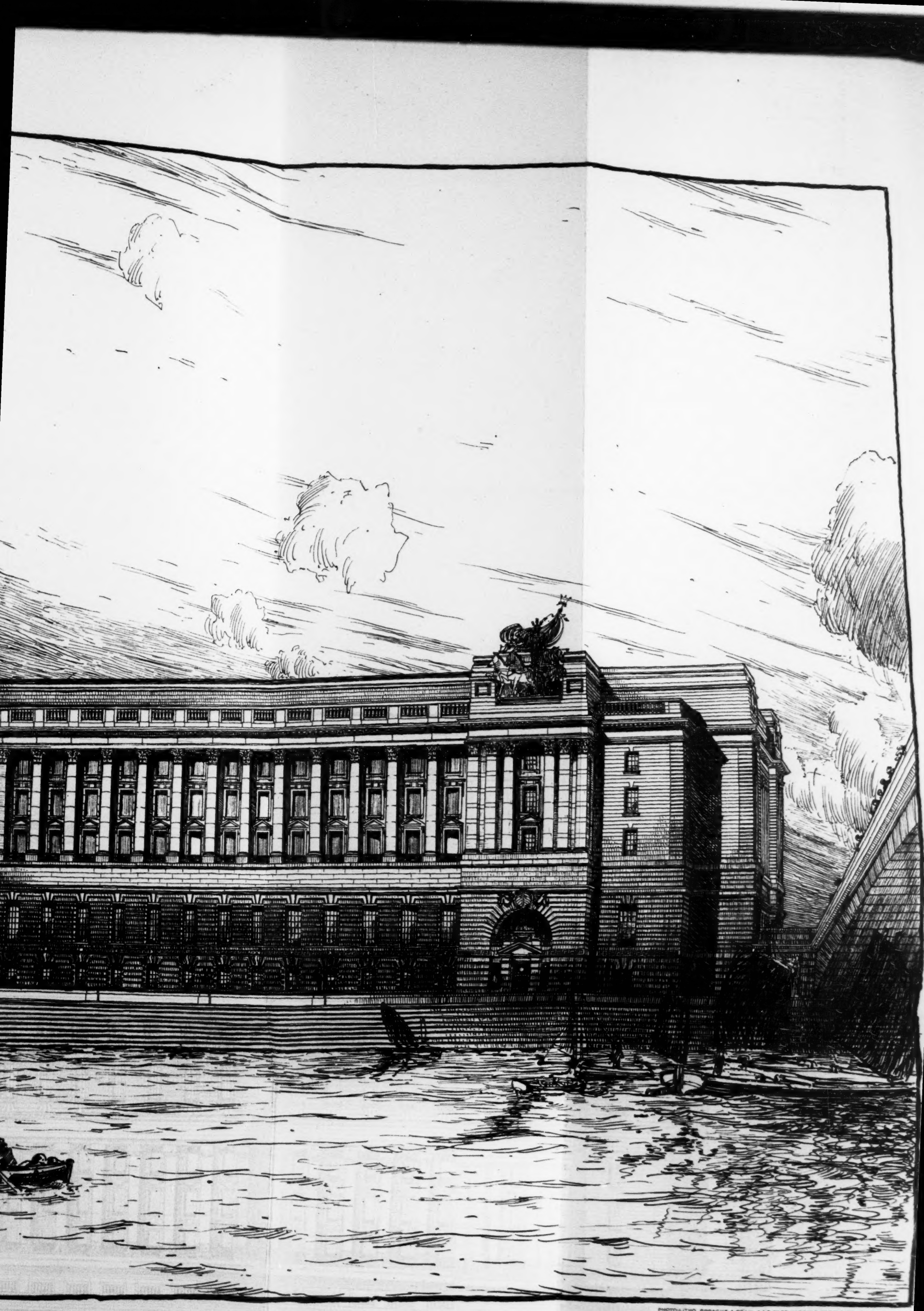
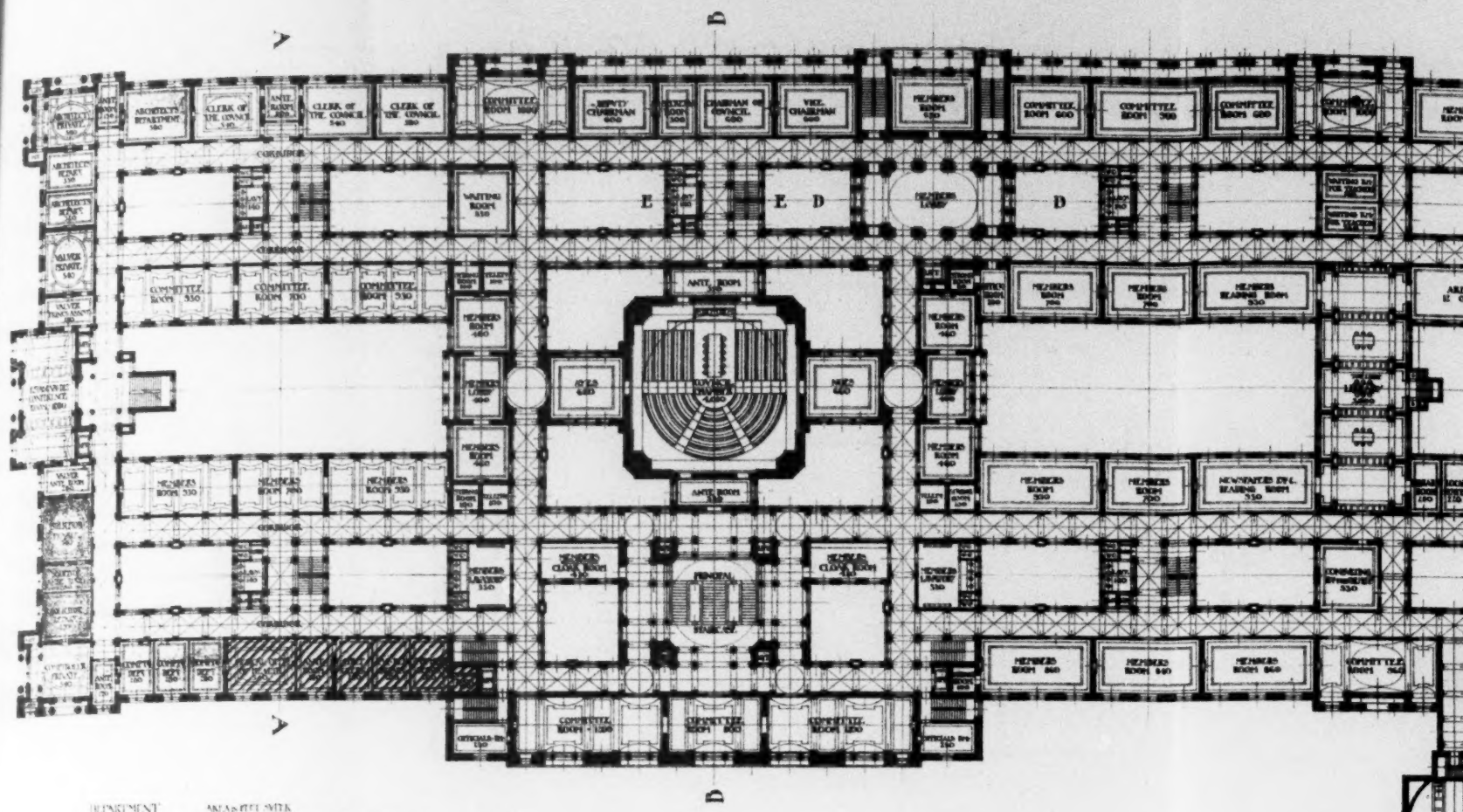


PHOTO-LITHO. SPRAGUE & CO'S L.T. 6 & 8 EAST HARDING STREET, FETTER LANE, E.C.

EDWIN COOPER, FF.R.I.B.A.

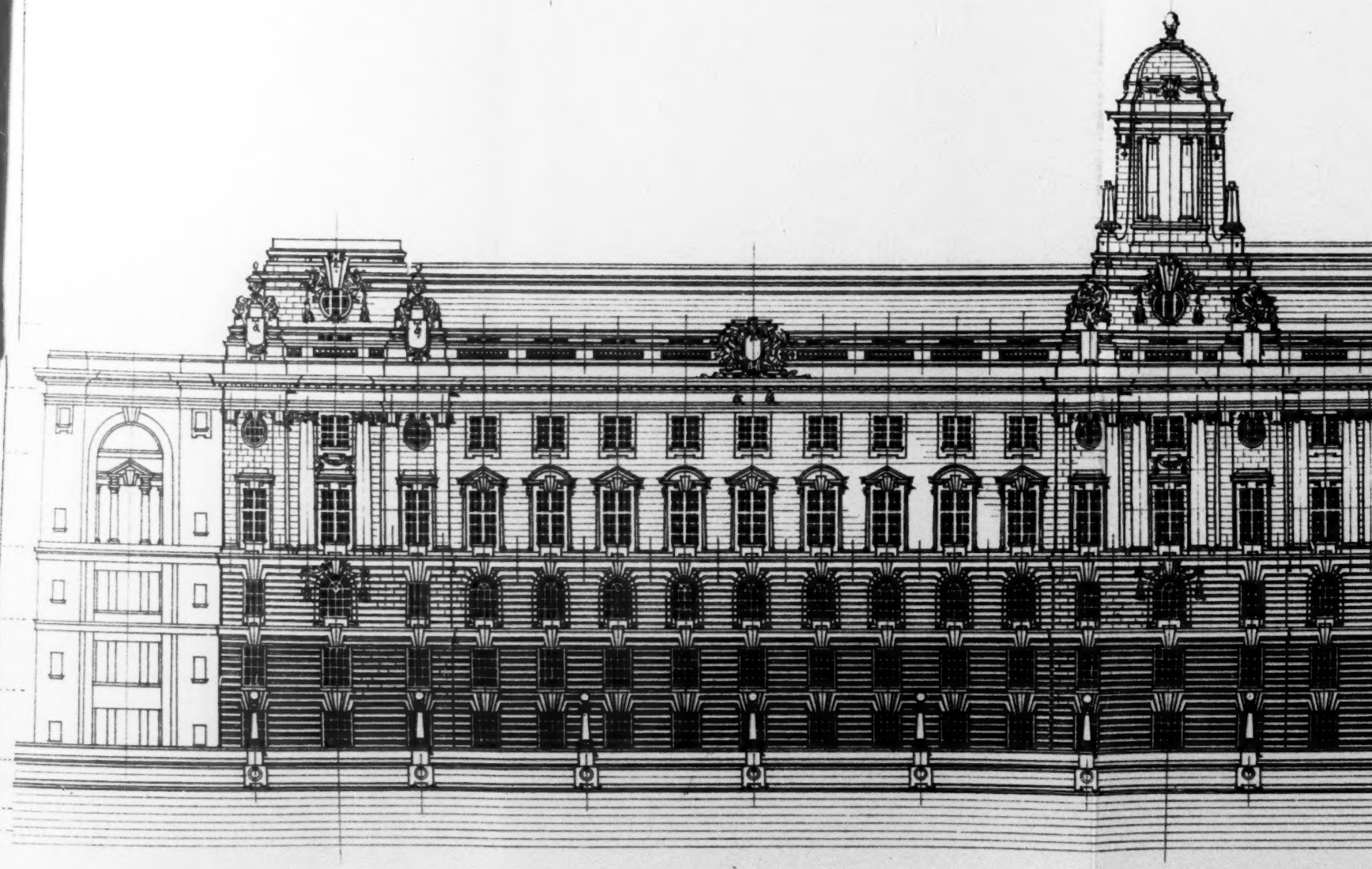


DEPARTMENT	AREA IN FEET SQUARE
COUNCIL CHAMBER, LOBBIES ETC.	6170
COMMITTEE ROOMS	10820
CHAIRMAN AND SECRETARIES ROOMS	2100
MEMBERS' ROOMS	15920
CLERK OF THE COUNCIL	1860
COMPTROLLER	1570
ARCHITECT	1960
ENGINEER	1780
SOLICITOR	1130
MEDICAL OFFICER OF HEALTH	1760
VALUER	2500
SECRETARY OFFICER	1360
CHIEF OFFICER OF FIRE BRIGADE	520

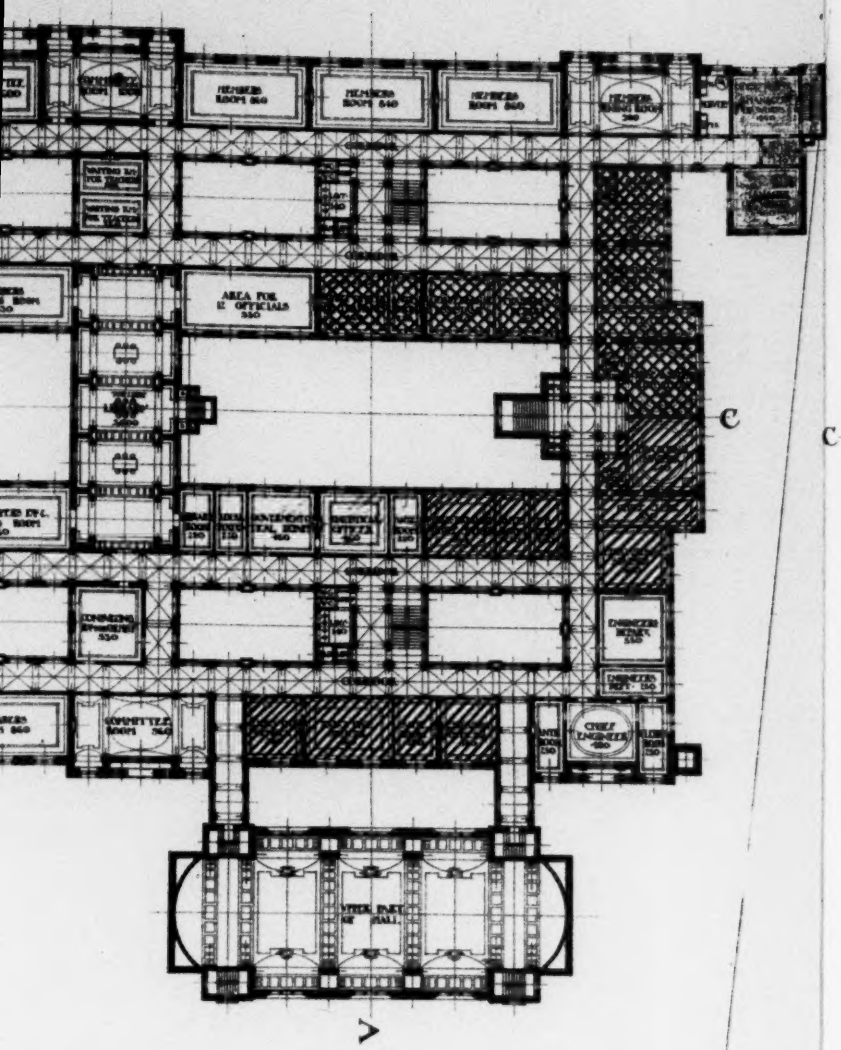
MANAGER OF WORKS	1060
CHIEF OFFICER OF TRAMWAYS	1600
EDUCATIONAL ADVISER	1450
EXECUTIVE OFFICER	1620
CHIEF INSPECTOR	1920
CHEMIST'S ROOM	530
WAITING AND OFFICES ROOMS ETC.	1756
LIBRARY, READING ROOMS ETC.	6040
DINING ROOM	560
LAVATORIES	1400
CLEANER	210
KEEPER OF COUNTY HALL	720

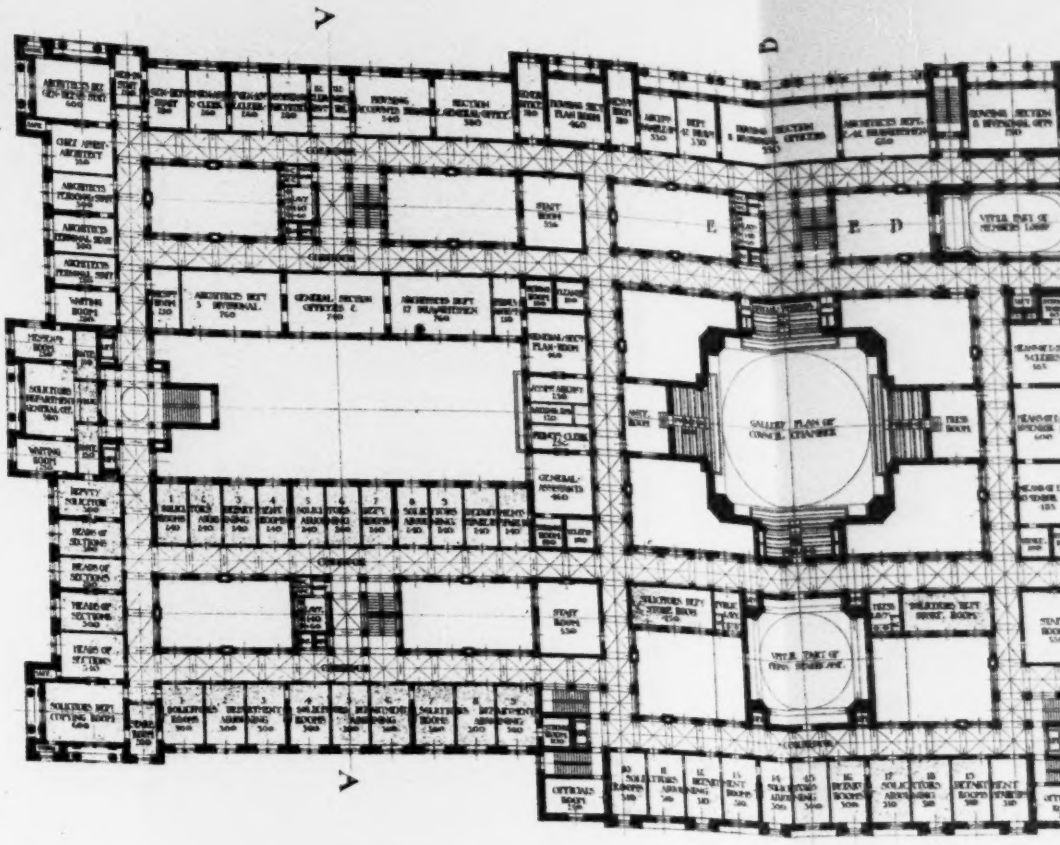
PRINCIPAL FLOOR

SCALE OF FEET



SCALE OF FEET





DEPARTMENT	AREA in FEET SUPR.
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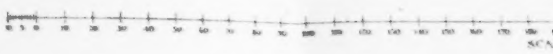
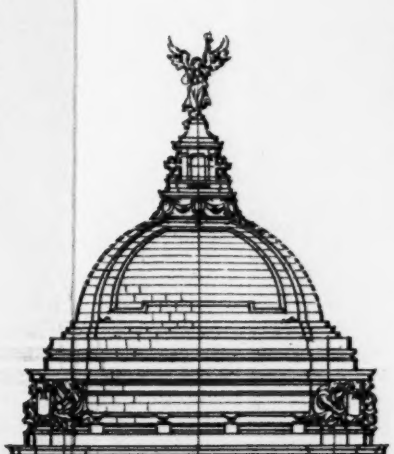
PRESS GALLERY & PRESS ROOM	858
ARCHITECTS DEPARTMENT	31358
SOLICITORS DEPARTMENT	13340
LOCAL GOVERNMENT and STATISTICAL DEPART.	8520
PRIV. DRAWING SECTION	1350
EDUCATIONAL ADVISERS DEPARTMENT	2450
WORKS DEPARTMENT or STAFF.	1120
STAFF ROOMS	3150
LAVATORIES	1680
CLEANER	310

FIRST





RIVER FRONT

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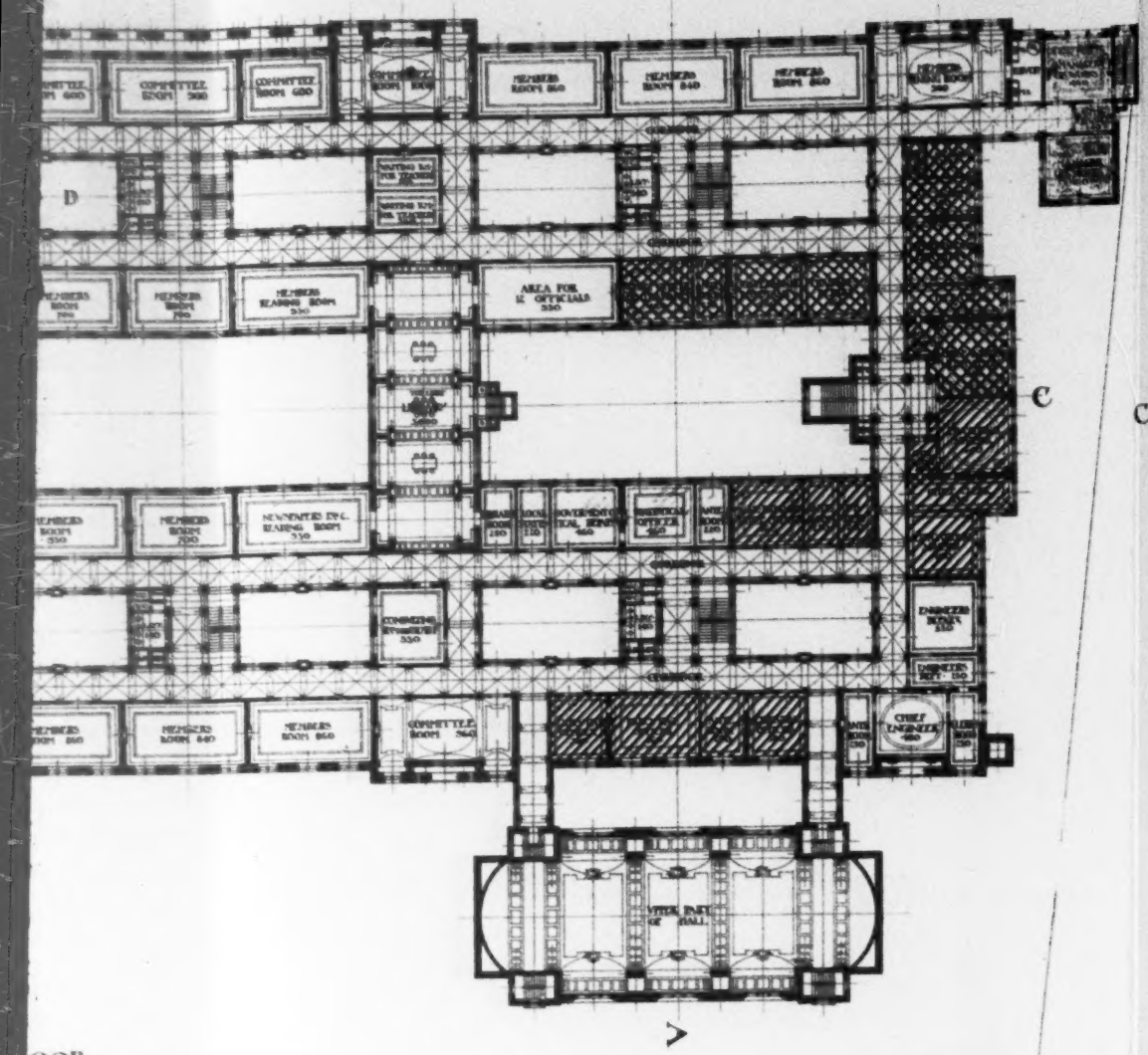
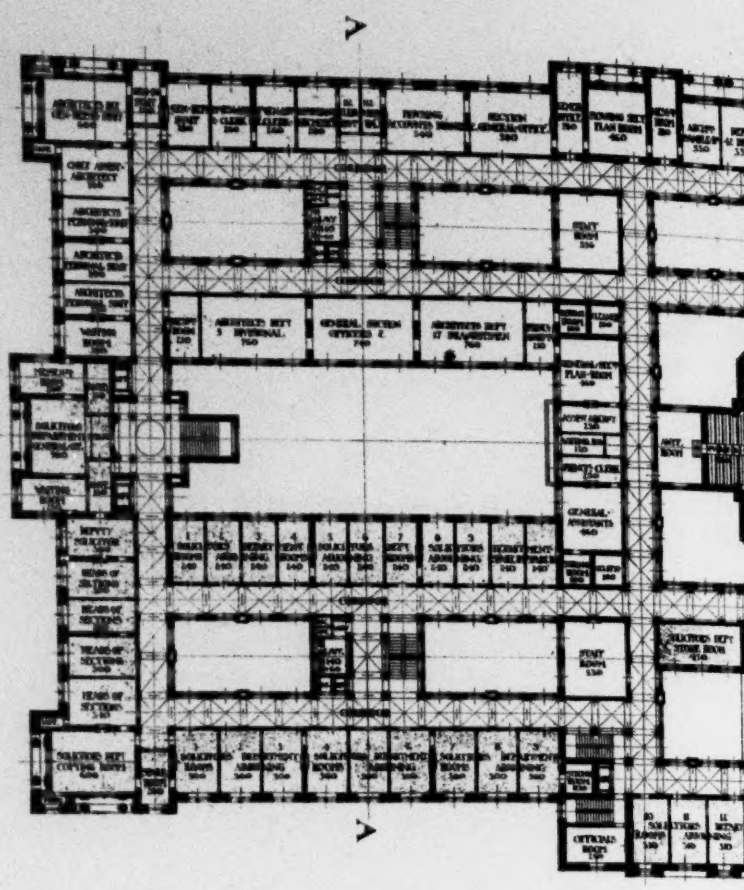
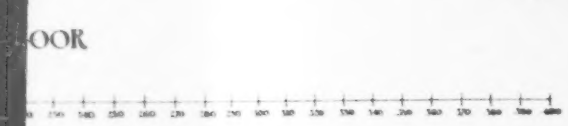
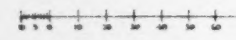
SCALE. or FEET

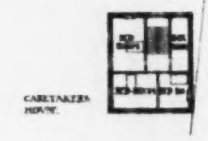




DEPARTMENT	AREA in FEET SUPR.
PUBLIC GALLERIES	1750
PRESS GALLERY & PRESS ROOM	850
ARCHITECTS DEPARTMENT	31350
SOLICITORS DEPARTMENT	13340
LOCAL GOVERNMENT AND STATISTICAL DEPTS.	8920
FIRE BRIGADE SECTION	1330
EDUCATIONAL ADVISERS DEPARTMENT	2450
WORKS DEPARTMENT OR STAFF	1120
STAFF ROOMS	3150
LAVATORIES	1680
CLEANER	310

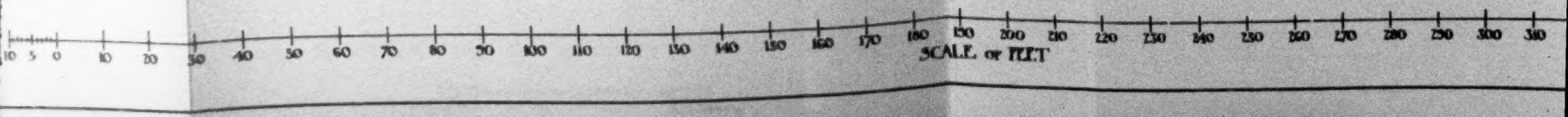






CARETAKERS HOUSE.

RIVER FRONT



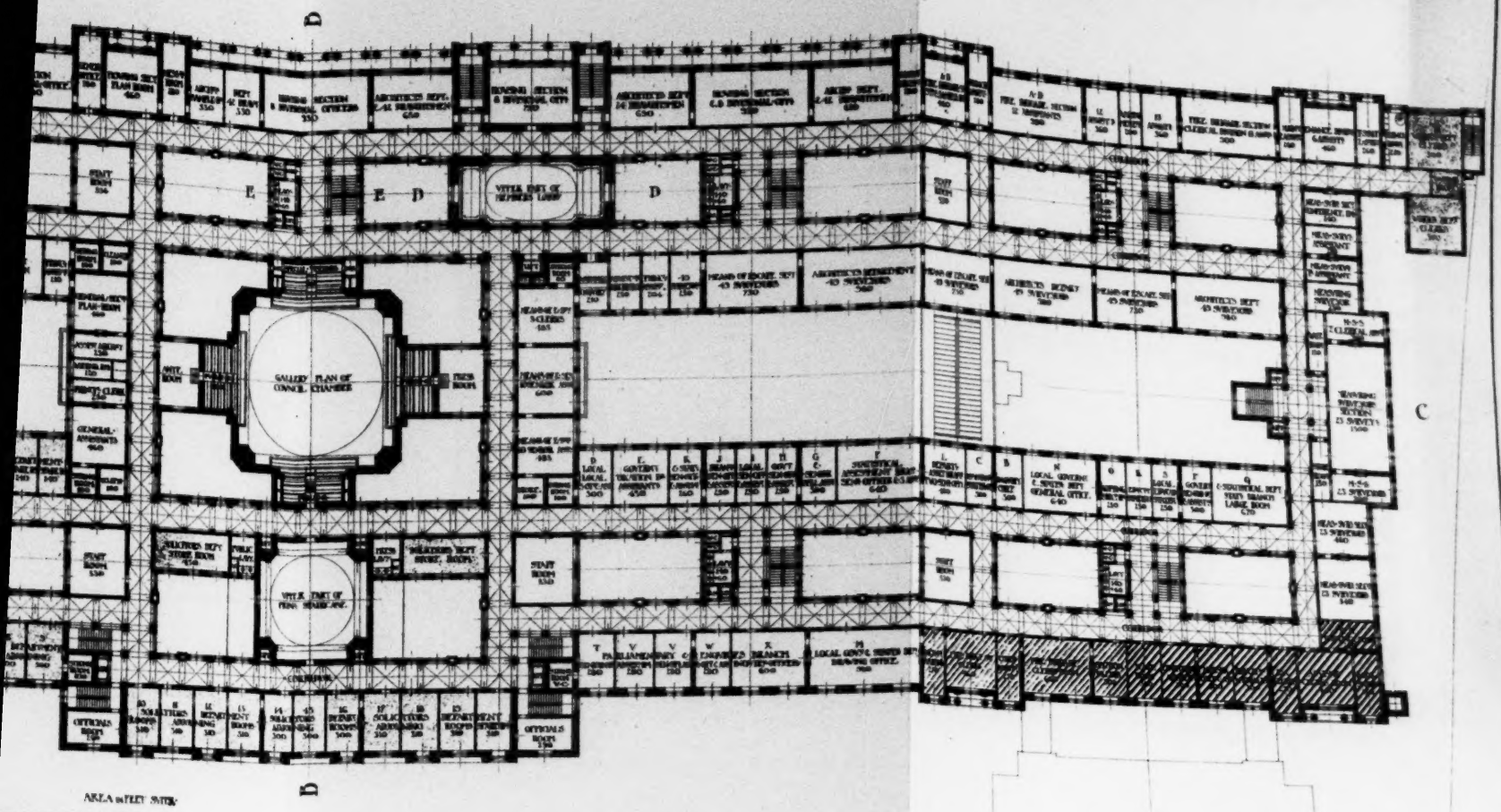


PHOTO-LITHO. SPRAGUE & Cº LTD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

their work was. If they saw the work of the City Guilds they would alter their opinions.

Mr. C. H. Barnsley, President of the National Federation of Building Trades' Employers, then proposed "The Founders and Past-Masters." He said that the success and importance of the Association was due

conditions of small contractors worked. It would be all right if they worked under the chief contractor, but they were independent of him, and that was not to the benefit and advantage of many buildings. The practice must result in a loss of enthusiasm and the best effort of a man when he had to put up

that builders made a mistake in doing this. He was glad to be able to say that architects, surveyors, and builders worked more together than they used to do. He remembered the time when there was scarcely any job of importance erected which did not occasion something of a contest. One of the troubles

of the quantity surveyor was that he had to adjust the contract, and that was a great difficulty. He was surprised that some builders signed some of the clauses they did.

Mr. F. G. Rice then proposed the toast of "The Guests," coupled with the name of Sir Melvill Beachcroft. He remarked that at times builders thought that every man's hand was against them, and that it was a crime to build; but they welcomed their guests most heartily that evening.

Sir Melvill Beachcroft, in response, said he knew of the unpopularity of the Water Board in the City of London and elsewhere, and he knew that so far as the master builders were concerned the President had done his best to obtain adequate consideration at the hands of that Board, and that if he had not obtained a satisfactory appreciation it was no fault of their President. The Water Board had a difficult task to perform, and he hoped that the time would come when some good things would be said of that Board. Although the Board appeared to be placing unjust burdens on many London consumers they should bear in mind the enormous responsibility of supplying good, pure, water to seven millions of people without a hitch or mistake. It involved the supply of 250 millions of gallons a day, and if there was a failure for one day he thought he knew what would be the position of the Chairman of that Board.

Mr. J. S. Gibson then proposed the last toast, *i.e.*, "The London Master Builders' Association and its President," and in doing so he referred to the intimate relationship between master builders and architects, which helped to produce fine buildings and fine architecture. That intimacy was of long standing; in fact, in the early days the architect was the master builder, who designed and controlled buildings as the architect does now, and it was the modern ways of living that had changed the relative position in that respect. During the best period of Greek art, when probably the noblest buildings ever erected were constructed, the work was done under the control of a master builder, and it was curious that this appreciation of great works of art and this capacity to originate and produce them went together with what he would call an acute businesslike instinct in the Greek people. There must have been a great deal of what he called ordinary human nature amongst the Greeks of that day, for when they intended to erect a great temple, and they went to the master builder and commissioned him to do the work, they made him pledge with the State security and valuables to the amount of 50 per cent. of the estimated cost of the building, and any extra cost in the way of extras, etc., was paid out of the security; while, if there was no extra cost, the security was returned. That seemed to be an astute method of dealing with a vexed question, but if the system were applied to modern buildings master builders might congratulate themselves that they were no longer architects; while architects, with their inadequate scale of payment, would probably give up the practice of architecture if they had to pledge security of that value and in such circumstances. The modern development of life had necessitated the carrying out of building in the way it was carried out, *i.e.*, it was inevitable that designs should in a measure be dissociated from the actual work. We engaged in much too big things to tackle them in the way they were tackled of old. Instead of spending a lifetime in building a cathedral about two and a half years had to suffice, and instead of building a County Hall in, say fifty or sixty years, it had to be done in ten. That spirit went right through modern building, and it was inevitable that the master builder must control the whole of the building operations, and he hoped the master builder would continue to do so, while the architect, if he was to do justice to his art, would be able to give all his thought to what to him was the chief part of his work, *i.e.*, the idea underlying all good building. The intimate relation between the master builder and the architect would continue to grow and would produce finer architecture and a better class of work. There was no good architecture without good building, and there was no good building without good architecture.

The President, in response, first referred to the cut-throat competition between builders and the supposed ring of contractors, which he said was a figment of the imagination of well-intentioned but extremely misguided and ill-informed individuals. As to the progress of the Association during the past year, their affairs were in a satisfactory state, notwithstanding the depressed state of trade. On the financial side the Association was never in a stronger position. During the past year there had been practically no trouble with the trade societies, and on very few occasions had the services of the Board of Conciliation been called into requisition. That was partly due to the depressed state of trade, but it was also due, in a measure, to the fact that the union officials no longer recognised every triviality which a dissatisfied workman endeavoured to construe into a grievance. He expressed on his own behalf and all members of the Association their sympathy with the hundreds, he might say thousands, of splendid mechanics, scaffolders, and labourers (a class quite distinct from, and who had the utmost contempt for, the noisy Socialistic street-corner spouter) who were walking about looking for work which, until some revival in trade took place, there seemed little likelihood of their obtaining. Whilst not desiring to discuss how that revival was to be brought about, one could not shut one's eyes to the enormous amount of manufactured goods, mostly of the vilest quality, being dumped down from abroad simultaneously with an influx of inferior and underpaid alien labour. As to the new headquarters of the Association, the Council had after two years at last secured a site admirably suited to their requirements, and he hoped that when his successor next addressed them, twelve months hence, they would be located in their own premises worthy of the Association, and attached to a building attributed to the great master of the classic revival, Inigo Jones. During the past year the Departmental Committee appointed to consider the question of accidents in the building trade and how they can be prevented had sent in its report. The Association were fortunate in having Mr. Shepherd, one of their past Presidents, on that Committee. He (the speaker) did not think the report was likely to be inimical to the members of the Association, but that, on the contrary, they would derive benefit from it, for the tendency would be to level up careless and slovenly contractors into line with those who took proper precautions to protect their men. As far as his experience went, he had found that comparatively few accidents occurred at a great height; the majority of them occurred close to the ground—that was where the building was well regulated and care was taken with the men—and in nine cases out of ten accidents were caused by the men's own carelessness. A matter in which he took a great interest was technical schools and apprenticeship. There was a favourite cry often made by persons who ought to know better that apprenticeship was dead, and all we could look to for training workmen in future were training-schools and polytechnics, but there never was a greater fallacy. It was true that indoor apprenticeship, except in small country towns and villages, was a thing of the past, but as to outdoor apprenticeship it was not so. A few years ago it was almost a universal desire for men to make clerks of their sons, but that was dying out to a great extent, and the majority of decent mechanics and better-class labourers were now anxious that their boys should be brought up to a trade; and, speaking in the presence of two most distinguished members of the London County Council, he said that if the County Councils throughout the country would take the matter up and would endeavour to foster a system of apprenticeship by supplementing or providing the premiums for the lads, and if some well-devised scheme could be thought out by which boys should be apprenticed, and in the early years of their apprenticeship spend a definite portion of their time (say, two half-days a week) in a technical school where they would learn the theoretical and mathematical part of their work, much good would result. He believed that there was no better mechanic in the world than the English mechanic, who knew his trade, and if some such scheme as he advocated could be settled we should reap incalculable advantage from it. The technical class was a very good handmaid of the shop, but it could never take the place of it, and he agreed with an observation he recently heard from a distinguished member of His Majesty's Government that what was wanted in the technical school was the atmosphere of the workshop, and he was convinced that the only way to obtain it was on lines such as he had indicated. A technical school by itself had a tendency to produce a sort of dilettantism in lads which by itself was almost useless. As to himself, he attributed the proud position he occupied that evening in no small measure due to the fact of his having been blessed with a father who had always been in the forefront in maintaining the best traditions of the Building Industry, and he concluded by thanking the Council for the loyal support they had given him during his year of office, and Mr. Costigan, the Secretary, for the energy and enthusiasm which he always displayed, and congratulated him on his return from his recent illness, and he thanked the company for the manner in which they had received the toast.

The proceedings then terminated.

Competitions.

CASTLETON BRANCH BATHS.—The Baths Committee, who have been assisted in their adjudication by Mr. A. Saxon Snell, F.R.I.B.A., have awarded the premiums in this competition as follows:—First premium, Messrs. Wallis & Bowden, Westminster, S.W.; second premium, Messrs. Butterworth & Duncan, Rochdale; third, Mr. P. W. Hathaway, Rochdale. The Committee have arranged for competitors to inspect the designs from February 24 to March 2 inclusive, between the hours of 10 a.m. and 5 p.m.

PROPOSED SCHOOL, YARDLEY.—At the meeting of the Worcestershire Education Committee held at the Shire Hall, Worcester, on Saturday last, the General Purposes Sub-Committee reported that they had examined twelve sets of plans for the new school in Golden Hillock-road, Yardley, and recommended the acceptance of those prepared by Mr. John G. Dunn, Newhall-street, which provided accommodation for 420 children in each of three separate departments. The estimated cost of the school buildings was 12,400*l.*, exclusive of cookery centre and caretaker's house, which were estimated to cost about 475*l.* and 375*l.* respectively. The report was adopted.

BOOK RECEIVED.

WOOD: A MANUAL OF THE NATURAL HISTORY AND INDUSTRIAL APPLIANCES OF THE TIMBERS OF COMMERCE. By G. S. Boulger, F.L.S., F.G.S., etc. Second edition; revised. (Edward Arnold. 12s. 6d.)

LONDON BUILDING REGULATIONS.—The President of the District Surveyors' Association has forwarded a circular letter to the various metropolitan borough councils covering resolutions passed at a general meeting of the Association, disagreeing with the provisions for the amendment of the London Building Act, 1894, being made in the London County Council (General Powers) Bill now before Parliament. The meeting were of opinion that the amendments, which would hardly be looked for in a General Powers Act, are of such importance as to form the subject of a separate Bill under the title of the London Buildings Acts, 1894-1905 (Amendment Act) Act, 1908, and it is submitted that any alterations in the building law should be made and found only in measures whose titles disclose that they are amendments to the London Building Acts.

Correspondence.

VENTILATION.

SIR,—The intimation, under letter from "Puzzled" in your last issue, that readers of the *Builder* would probably be glad to have the opinions or experience of others on the inconsistency of those who condemn *downward ventilation*, induces me to again set forth, in few words, what I have previously advanced at meetings of the Royal Institute of British Architects and the London Architectural Association.

Always allowing that *down draught* is ever objectionable, and a thing apart from *downward ventilation*, it is easy to demonstrate that the latter accords with Nature's methods, and is capable of useful employment.

The open fire, as a means for encouraging change of air in an apartment, is almost invariably extolled. Let anyone test for himself, and he will find that the flue opening, which is *near the floor level*, is practically the only outlet for air from the apartment.

Inlets there must be, and should they be about the lower portion of the apartment, occupants will experience discomfort from draughts; if higher up, there may be less discomfort, and with the main inlet slightly below the ceiling, suitably proportioned and on *the same side as the fireplace*, the greatest comfort may be secured, although change of air is brought about in a *downward direction*.

Again. Consider a large hall closely packed with people. How can each individual be supplied with air in a better way than from above, where it exists in large volume with little to contaminate it? Whereas, if the air is supplied from below, it must pass over the bodies of others ere it can arrive at the lungs of anyone.

In order to appreciate how comfortable ventilation can be brought about it is necessary to clearly understand and keep in mind that when the temperature of air is raised it ascends, not simply because it is light, but only when it is *forced* upwards by cooler air around being attracted downwards by gravitation.

With this fact fully grasped, it becomes apparent that, by the open fire, ventilation is brought about by propulsion and not by extraction, as is too commonly but erroneously supposed, and that mechanical means for securing propulsion, and thereby ventilation in a downward direction, accord with the laws of Nature, which, when set in action by an open fire, meet with general approval. WILLIAM HENMAN.

Birmingham, February 21.

SIR,—With reference to the remark of your correspondent "Puzzled" in last week's issue of your journal, what should be aimed at in ventilating apartments is the change of air sufficiently often without causing appreciable draughts. If cold air is admitted in volume through a horizontal or vertical opening at or near the ceiling, it drops at once on to the heads of the occupants, and if admitted at or near the floor line it chills the feet.

The vertical-tube system is a compromise, enabling the incoming current of fresh air to spread in a fountain-like manner, and to become diffused by mixing more gradually with the warmer air in the apartment.

It is extremely difficult to get a system of ventilation that will be satisfactory to persons of different temperament in this variable climate, and yet meet the theoretical requirements for healthy occupation of a crowded room, but the introduction of electric fans for exhausting air has made the problem less difficult of late years, and the judicious arrangement of the air inlets becomes the most important consideration. HENRY CARTER.

LETCHWORTH GARDEN CITY.—The new mission church of St. Michael and All Angels was dedicated on Saturday last. It is designed on somewhat unconventional lines, and is seated for 310 persons. The contractors were Messrs. Raban & Sons, of Baldock, Herts, and the architects Mr. E. H. Heazell, of Nottingham, and Mr. C. M. Crickmer, of London and Letchworth.

The Student's Column.

REINFORCED CONCRETE BEAM FORMULÆ.—VII.

PRACTICAL DATA (*concluded*)—HYPOTHETICAL DATA.

(21.) *Compressive and Tensile Strength of Steel.*—Mild steel is of approximately equal strength in compression and in tension. The British Reinforced Concrete Committee recommend that the steel used should possess the following properties:—

(a) *Ultimate strength* not less than 60,000 lb. per square inch.
(b) *Elastic limit* not less than 30,000 lb. per square inch and not more than 36,000 lb. per square inch.
(c) *Elongation* not less than 22 per cent. in a gauge-length of 8 diameters for bars of 1 in. diameter and under; and not to be less than 27 per cent. in a gauge-length of 4 diameters for bars of 1 in. diameter and over.

(22.) *Shearing Strength of Steel.*—The ultimate resistance of steel to shearing stress is from 70 per cent. to 75 per cent. of the ultimate tensile strength. Accepting 60,000 lb. for the lower limit of tensile resistance for steel to be used in reinforced concrete beams, the ultimate shearing strength of the metal should be not less than 42,000 lb. per square inch. For mild steel with the tensile strength of from 28 tons to 32 tons per square inch, the shearing strength is from 44,000 lb. to 54,000 lb. per square inch, and may safely be taken at the approximately mean value of 48,000 lb. per square inch.

(23.) *Coefficient of Elasticity of Steel.*—The value of this coefficient varies from 28,000,000 lb. to about 36,000,000 lb. per square inch, a safe average value being 30,000,000 lb. per square inch. If the coefficient of elasticity of high-carbon steel were materially higher than that of mild steel, the higher elastic limit of the former would constitute an undoubted advantage in respect of economy. But any attempt to utilise the greater tensile strength of high-carbon steel would naturally tend to cause cracks to an undesirable extent in the lower surface of reinforced concrete beams and thereby to expose the steel to corrosive influences.

(24.) *Adhesion between Concrete and Steel.*—The existence of a secure bond between the two materials is very important. Tests made by numerous well-known authorities during recent years suggest that the adhesion between concrete and steel may be as low as 93 lb. or as high as 1,367 lb. per square inch of surface in contact. As the result of tests made at the University of Illinois during 1904-6, Professor Talbot concludes that the average bond developed with ordinary plain round mild steel bars is about 400 lb. per square inch of surface contact.

The most recent adhesion tests are those made in August, 1907, at Washington University under the direction of Professor J. L. Van Ornum. The bars were of ½-in., ⅝-in., ¾-in., 1-in., and 1¼-in. diameter, five sets being of mild steel and five sets of high-carbon steel. The mild steel bars were embedded 25 diameters and the high-carbon bars were embedded 40 diameters in concrete mixed in the proportions of 1 : 2 : 4. After hardening for ninety days the specimens were tested, with the result that the adhesion for mild steel was found to range from 370 lb. to 460 lb. per square inch of surface in contact, and that the adhesion for high-carbon steel was found to be from 330 lb. to 470 lb. per square inch of surface in contact. It was also found that after the bond had been destroyed by the contraction of area of the bars when under tension, there still remained a frictional bond which ranged from 310 lb. to 380 lb. per square inch of surface in contact in the case of mild steel, and from 200 lb. to 280 lb. per square inch of surface in contact in the case of high carbon steel.

For practical use in reinforced concrete design 400 lb. per square inch may be taken as the value of the adhesion bond, giving the working value of 100 lb. per square inch, with 4 as the factor of safety. By splitting or bending the ends of reinforcing bars additional security is obtained.

(25.) *Extensibility of Reinforced Concrete.*—The conclusion of Considère that reinforced concrete will submit without rupture to a proportionate elongation of from ten to twenty times that which would cause the failure of plain concrete is not accepted at the present time. Plain concrete is ruptured when elongated to from 0·00006 to 0·0002 of its length, a fair average value being 0·0001.

In reinforced concrete beams where the adhesion bond is perfect, the elongation of the concrete in tension must be equal to the elongation of the steel. Then if the steel be subject to the tensile strain of 15,000 lb. per square inch, the proportionate elongation of both the steel and the concrete will be approximately

$$\frac{15{,}000}{30{,}000{,}000} = 0{\cdot}0005$$

The stress corresponding to the proportionate deformation of 0·0005 is governed by the value of the coefficient of elasticity of concrete in tension. Although the coefficient may be taken as a constant within ordinary limits of working stress, its value is undoubtedly reduced as the stress is increased. The constant value of 2,000,000 lb. would indicate for the deformation of 0·0005 the stress of

·0005 + 2,000,000 = 1,000 lb. per square in.

or from three to five times the ultimate resistance of concrete in tension.

According to the conclusions of Professors Talbot and Turneaure, and the more recent results of Professor Bach, the elongation of 0·0005 is about five times the elongation that will produce very fine surface cracks in reinforced concrete, although the cracks may not be visible to the unaided eye. The presence of cracks even if invisible is an indication that the tensile resistance of the concrete has been overcome. Therefore no allowance should be made in the design of reinforced beams for the tensile resistance of concrete. Practical experience has not yet suggested that fine surface cracks corresponding with the proportionate elongation of from 0·0005 to 0·0006 are likely to expose the reinforcement to corrosive action.

(26.) *Safe Working Stresses and Factors.*—In practical formulæ for designing reinforced concrete beams the best plan is to fix definite limits of stress which must not be exceeded in either the concrete or the steel.

The elastic limit or yield point—and not the ultimate strength—of the steel in tension, and the ultimate compressive strength of the concrete, govern the ultimate resistance of a reinforced concrete beam. In the case of the steel, the proper course is to apply the factor of safety of 2 to the elastic limit. Then if the elastic limit be 30,000 lb. per square inch we get the safe working stress of 15,000 lb. per square inch. In the case of the concrete the factor of safety of 4 should be applied to the value of the ultimate compressive strength. If that value be 2,000 lb. per square inch we get 500 lb. per square inch as the safe working stress. For other values of the ultimate compressive strength of concrete corresponding safe working stresses should be similarly determined (see Section 17).

Judging by some articles in technical journals and by remarks which have been made elsewhere, there seems to be an impression abroad that reinforced concrete beams can be safely designed by treating certain working stresses as constants applicable to all qualities of concrete and steel. That is a dangerous fallacy which must on no account be entertained. Notwithstanding the high values recently suggested by some investigators for the shearing strength of concrete and for the adhesion between concrete and steel, the conclusions of the French *Commission du Ciment Armé* are to the effect that the limits of resistance

to shear, to longitudinal sliding of particles of concrete upon each other, and to forces tending to destroy the adhesion between the concrete and the steel shall not be greater than one-tenth the working stress for concrete in compression. This limit is equivalent to one-fortieth the ultimate compressive strength of concrete.

Within the limits of safe working stresses computed as proposed in this section, the coefficients of elasticity for concrete and steel may be regarded as complying with Hooke's law of the proportionality of stress and strain. For qualities of concrete not poorer than 1 : 2 : 4 the value of 2,000,000 lb. per square inch may safely be accepted in general practice (see Section 20). The coefficient of elasticity for mild steel may be accepted in general practice at 30,000,000 lb. per square inch (see Section 21).

(27) Table IX. contains values of safe working stresses and factors for concrete and steel for use in reinforced concrete beams, these values being stated in accordance with the discussion in the preceding sections.

TABLE IX.—SAFE WORKING STRESSES AND FACTORS FOR USE IN REINFORCED CONCRETE BEAM FORMULÆ.

Concrete. Age 1 month.		Lb. per sq. in.
Compressive stress	1 : 1½ : 3 ...	550-650
" "	1 : 2 : 4 ...	500-600
" "	1 : 2½ : 5 ...	450-550
" "	1 : 3 : 6 ...	400-500
Tensile stress.	All mixtures	0·0
Shearing stress	1 : 1½ : 3 ...	55-65
" "	1 : 2 : 4 ...	50-60
" "	1 : 2½ : 5 ...	45-55
" "	1 : 3 : 6 ...	40-50.
Coefficient of elasticity	1 : 1½ : 3 ...	2,000,000
" "	1 : 2 : 4 ...	2,000,000
" "	1 : 2½ : 5 ...	1,875,000
" "	1 : 3 : 6 ...	1,750,000
Steel. Mild.		
Compressive stress		15,000
Tensile stress		15,000
Shearing stress		12,000
Coefficient of Elasticity		30,000,000
Elastic limit		30,000-36,000

HYPOTHETICAL DATA.

(28.) *Assumptions Necessary.* — Every rational theory of reinforced concrete beam design must be founded upon certain hypothetical data which are not absolutely exact. Assumptions of the kind relate to :—

(1) The direction of applied forces.
(2) The action of contiguous fibres of the material.
(3) The adhesion between concrete and steel.
(4) The form of originally plane sections during the bending of a beam.
(5) Initial stresses in concrete and steel.
(6) The resistance of concrete to tension.
(7) The value of the coefficient of elasticity of concrete.

(29.) *The Direction of Applied Forces.*—In the case of beams, loads are usually applied perpendicularly to the neutral axis, but the result of deflection is obviously to disturb the arrangement, although to so small an extent that the direction of the applied forces can be accepted as being practically perpendicular to the neutral axis.

(30.) *The Action of Contiguous Fibres.*—Although there is ample reason for believing that the cohesion of adjoining fibres in beams has the effect of increasing resistance to flexure, it is usual for the purposes of calculation to regard the fibres as if each layer acted independently. This hypothesis simplifies computations and increases the general factor of safety.

(31.) *Adhesion between Concrete and Steel.*—Sufficient evidence exists to suggest that the deformation of the reinforcing bars and the concrete in which they are embedded is not always of equal extent, and that where high stresses are in question there may be slipping of the bars inside the concrete.

Nevertheless, under working conditions we may safely assume the adhesion bond between the concrete and the steel to be perfect.

(32.) *The Form of Originally Plane Sections during the Bending of a Beam.*—An important assumption is that originally plane sections of a beam remain plane during the bending of a beam. In other words, the hypothesis is that the deformation of the fibres is directly proportionate to their distance from the neutral axis. This hypothesis is generally accepted, and its substantial accuracy is supported by the measurements of Professor Talbot * and other authorities.

(33.) *Initial Stresses in Concrete and Steel.*—According to Considère concrete shrinks when hardened in air, causing in reinforced concrete tensile stress in the concrete and compressive stress in the steel. Initial tension in the concrete is clearly an advantage on the compression side of a beam, and a disadvantage on the tension side. For the purpose of computations where the resistance of concrete to tension is disregarded, the question of initial stresses need not be taken into account.

(34.) *The Resistance of Concrete to Tension.*—In some theories tensile stress is assumed to be resisted in part by the concrete. Consideration of the data in Sections (18) and (25) shows that concrete in tension is only of practical value for loads involving stresses not exceeding 200-300 lb. per square inch, and proportionate elongations not exceeding 0·0001-0·0002.

Taking the higher of these two values of the proportionate elongation of the concrete, the corresponding stress in the steel is 0·0002 × 30,000,000 = 6,000 lb. per square in.

As increased stress in the steel would cause incipient failure of the concrete, any attempt to utilise the full tensile strength of that material would make it necessary to use steel wastefully.

The only part of the concrete in a beam that can be of service in tension is a small portion near the neutral axis, and the value of which is scarcely worth consideration. In view of these facts and of the probability that initial tension may exist in the concrete, the best practice is to assume that tension is borne entirely by the reinforcement.

This assumption has been accepted by the Prussian Government, the French Ministry of Public Works, the German Association of Engineers and Architects, the British Reinforced Concrete Committee, and many other authorities.

(35.) *The Value of the Coefficient of Elasticity of Concrete.*—In some theories account is taken of variations in the value of the coefficient of elasticity of concrete. It is the fact that beyond certain limits of stress the value of the coefficient becomes smaller. Whence, accepting the hypothesis that originally plane sections remain plane during the bending of a beam, the stress-strain line is a curve. Therefore in formulæ applicable to the ultimate strength of reinforced concrete beams the value of the coefficient of elasticity should be taken as variable. But in formulæ intended for practical design, where the stresses are kept within specified safe limits, the value of the coefficient may properly be treated as a constant for every given quality of concrete. This practice is justified by well-attested experimental results, proving that for stresses up to nearly one-half the ultimate strength of concrete in compression there is no sensible error in regarding the stress-strain line as a straight line. The assumption simplifies calculations, and has been accepted by the authorities named in Section (34) and many others.

(36.) *Summary of Safe Hypothetical Data.*—The fundamental assumptions adopted in the theory and formulæ which follow are :—

(1) That forces are applied in a direction perpendicular to the neutral axis of a beam.
(2) That contiguous fibres act independently.
(3) That the adhesion between the concrete and the steel is perfect.
(4) That an originally plane section remains plane during the bending of a beam.
(5) That there are no initial stresses.
(6) That tension is borne entirely by the reinforcement.
(7) That the value of the coefficient of elasticity of concrete is constant within the limits of safe working stress.

(37.) *Notation Adopted.*—In all the formulæ which follow we have adopted the standard notation given in Table V.

That system of notation embodies the ratio method of dealing with certain essential factors entering into reinforced concrete beam equations. (See Section (3)).

* "Journal of the Western Society of Engineers." August, 1904.

PRESERVATION OF ANCIENT IRISH MONUMENTS.

SIR THOMAS ESMONDE asks the Chief Secretary of Ireland in the Parliamentary papers what ancient monuments have been been notified to the Board of Works as worth preserving by the Estates Commissioners since the passing of the Purchase Act of 1903.

Mr. Birrell, in reply, refers the hon. member to a list of fifty-two monuments, of which particulars were given in May of last year (and which were reported in the *Builder* at the time). The Commissioners had since communicated to the Board of Works particulars of the following:—Kilmallock Abbey, co. Limerick; Buolick Church, co. Tipperary; Cross in Carpenterstown, co. Cork; Lixnaw Castle, co. Kerry; Dromineer Castle, co. Tipperary. Of the total, the Board of Works have been able to accept the vesting of the following as being of sufficient historical, artistic, or traditional interest, namely:—Drumbo Round Tower, co. Down; Augustinian Abbey, Callan, co. Kilkenny; Ballyboggan Abbey, co. Meath; Kilmallock Abbey, co. Limerick. The respective county councils have consented to the following being vested in them, and the vesting has been completed in the cases marked with an asterisk:—*Carbery Church, co. Kildare; Ballycowan Castle, King's County; Srah Castle, King's County; Heathstown Castle, co. Westmeath; Mahee Castle, co. Down; Round Tower, co. Down, Church, co. Down; Mulrankin Castle, co. Wexford; Castle, co. Westmeath; Carrig Castle, co. Tipperary; *Gortnaclea Castle, Queen's County; *Cornaveigh Castle, co. Cork; Seahorse Monument, co. Waterford; *Giants Grave, co. Tyrone; Down Macpatrick Castle, co. Cork; Cross, co. Westmeath.

THE ARCHITECTURAL ASSOCIATION PLAY.

THE successful revival, in 1907, of the annual play, which was for many years the principal event in the social life of the Architectural Association, left no doubt in the minds and intentions of the musical spirits in that body of enthusiasts as to the future continuance of the event. The productions are invariably the entire work of the members, amongst whom is to be found much musical and other talent.

The annual performances took place during the current week, the first being held at the Gaiety Restaurant on Wednesday evening, the 26th inst., when a "Musical Prophecy in two Acts," entitled "Metopemania or a Sparing Use of Art," was produced before a large and representative professional audience.

The play is the work of the editorial staff of our esteemed contemporary, *The Purple Patch*, arranged almost entirely in verse, and endeavours to show, quoting from what may be termed the argument, the current popular misconception of the difference between artist and art dealer or antiquary, or, indeed, "the ready-made home provider." It apprehends the early disappearance of individual artists and craftsmen, and that they, architects especially, will be submerged in municipal or other organised artistic enterprise.

The establishment of Messrs. Sparing & Flashy, in the Quadrant, Regent-street, "built in the Norman style," is one such firm in A.D. 2008, and here are laid the two scenes of the first act. Samuel Sparing is the "boss" of the business, which commercialises all transactions in what the public is pleased to term art. He will produce and provide anything to suit any taste, from a Gothic kirk to a Victorian workhouse; he will utilise features and furniture of all periods. But the artist is submerged. The chief assistant gives the key to the situation, and says "adapting is our trade." Sparing & Co. pander very generously to the popular desire for antiques, and the second assistant informs the Reporter from *The Purple Patch*, who has pledged himself to ameliorate the lot of the artists in subjection, that "Design is 'oot of date . . . yo ken this firm has sic a spate o' panelling and ceilings."

Sparing's real aim in life is to win the great competition for rebuilding the city of Metope, and the basis of the idea is the re-erection of old buildings transported from their original sites.

The play is transferred in the second act to Valhalla by the magic agency of the Reporter, who has beguiled Sparing into meeting Michelangelo, Raphael, Wren, and other old masters, with the ultimate idea of securing some masterpieces to assist in winning the competition. They at first express abhorrence at Sparing's commercial proposals, but eventually succumb to his wiles and produce "potboilers" in order to get long notices in the earthly press and the privilege of the five-lettered affix—F.R.I.B.A.

The final scene at the Quadrant is in effect the triumph of the individual artist, wherein Sparing's assistants themselves win the competition for the rebuilding of Metope. Sparing is defeated by his own principles and methods.

The general idea of the play, although somewhat extravagant, was well sustained. The music, composed by Mr. Kelly, was extremely good, admirably rendered by band and chorus alike. Mr. Carvill's interpretation of the part of the Reporter was a great achievement, and with the effort by Mr. Clapham as Mr. Sparing, constituted a sound working basis for the play. The three chief assistants, Messrs. Wontner-Smith, Scott, and Smithers, were excelleht in every way. The Christopher Wren of Mr. Spoor, and the Bernard Shaw of Mr. Buss, were amusing parts rendered with fine imagination.

The interest never lagged, the choruses were strong, and the dances spirited. A word must be said for the clever scene-painting, portions of the design for which were duly acknowledged as the work of Mr. Norman Shaw. An extremely funny item was the mock raising and lowering of an antique fireproof curtain, whereon "local hits at follies of the day" were extensively advertised.

There was no doubt, judging by the applause and enthusiasm of the "cultured" audience, that the performance was a complete success, worthy of the annals of the Association.

The play was printed as Spasm VIII. of *The Purple Patch*, and the proceeds go to the funds of the Architects' Benevolent Society.

Obituary.

MR. CALLOW.—The death, at a greatly advanced age, on February 21, at "The Firs," a house he built for himself near Great Missenden, Bucks, is announced of Mr. William Callow, R.W.S., F.R.G.S. Mr Callow, who was born in Greenwich on July 28, 1812, went, when seventeen years of age, to Paris, where he exhibited in the Salon, and, acquiring a high reputation as a teacher, was employed to give lessons to members of King Louis Philippe's family. Returning to England he was elected in 1838 an Associate, and a full member of the Royal Water-colour Society in 1846; he lived to be the last representative of the old school of English painters in water-colours, and continued the practice of his art until the failure of his eyesight, about three years since. In last autumn a large collection of his works was exhibited in the Leicester Galleries. Mr. Callow was awarded a gold medal at the Salon, 1840, and sent some paintings in oil to the Royal Academy exhibitions.

General Building News.

THE "EGLISE RÉFORMÉE EVANGÉLIQUE FRANÇAISE DE BAYSWATER."—The Building Committee have accepted the plans of Messrs. Roumieu & Aitchison for a thorough restoration of this church. The scheme includes the removal of the existing plaster ceiling, and the construction of an open timber roof. It is also proposed to make a social-room or vestry in the basement, with the usual accessories, and with access thereto from Monmouth-road. The efficient heating and the lighting by electricity is also to be taken in hand. The contractors for the work are Messrs. Barrett & Power, of Hackney.

KIRKBY MALZEARD CHURCH.—The ancient parish church of St. Andrew, at Kirkby Malzeard, some seven miles west of Ripon, was totally destroyed by fire on the morning of February 8. The fire is attributed to a stove-pipe which went through the roof, the beams of which are supposed to have been first ignited. The damage is estimated at 5,000*l*., which is only covered by insurance to the extent of 2,730*l*. The Church of St. Andrew, which is said to occupy the site of a Saxon church, is a building of stone, dating from about 1050, with some Norman and early English portions, but chiefly in the Perpendicular styles. It was restored in 1879-80, at a cost of 4,000*l*., under the direction of the late Sir A. W. Blomfield, A.R.A. There are sittings for 450 persons. A scheme has already been initiated for providing a fund for the restoration of the church, and it has been resolved to consult Mr. J. Oldrid Scott on the subject.

CHURCH ENLARGEMENT, TORQUAY.—The Bishop of Exeter recently consecrated the new chancel at Ellacombe Parish Church, Torquay, its construction having formed a part of the renovation scheme which has been effected. New vestries have also been built, and an additional entrance to the church has been made on the north side. An entirely new system of ventilation has been installed, and in addition the organ has undergone extensive improvement. The cost of the scheme, which has been carried out by Messrs. R. F. Yeo & Sons, to the designs of Mr. C. J. Tait and Mr. Harvey, of Exeter, is 3,000*l*.

CHURCH IMPROVEMENTS, HURST, BERKS.—Alterations and improvements have been made at the Hurst Parish Church. The work was carried out under the supervision of Mr. T. Falconer, architect, by Mr. J. B. Seward, builder, of Wokingham.

CONGREGATIONAL CHURCH, PRENTON, CHESHIRE.—The Congregationalists of Prenton are erecting a new church. The building will consist of nave, transepts, chancel, minister's and deacons' vestries, church parlour, and class-rooms. The whole of the walls, both externally and internally, will be faced with Storeton stone. When finally completed, the church will seat over 600 persons, and provide for the adding of a future end gallery if found desirable. The total cost, exclusive of site, is over 6,500*l*. The building plans have been prepared by Mr. Thomas W. Cubbon, of Birkenhead.

ST. MARY DE CRYPT, GLOUCESTER.—A fund has been opened for the purpose of restoring certain portions of this building. Mr. F. W. Waller, the Diocesan Architect, has prepared a report on the matter, and shows that restorative work is needed to the tower and belfry, and much of the stonework of other parts of the fabric, the approximate cost of which will be 2,000*l*. Other work, such as strengthening the roof and cleaning the interior, raises the amount required to 3,000*l*.

NEW CHURCH SCHOOLS, LONDON.—The old schools of Christ Church, Battersea Park, have been demolished, and a new block of schools of one story, comprising combined accommodation for 300 scholars (girls, boys, and infants), is now being erected by Mr. W. Hammond, Yelverton Works, Battersea, to the designs of Mr. A. H. Ryan-Tenison, F.R.I.B.A., of Westminster. This school is the first of a new type in which each department has the use of a general corridor.

BOARD SCHOOL, MONYMUSK, N.B.—A new Board school has been built at Monymusk from plans prepared by Mr. W. E. Gauld, architect. The building consists of a main rectangular block facing the south, with science-room, cookery-room, teachers'-room, and scholars' cloakrooms to the north. The rooms, corridors, and cloakrooms are heated by hot-water circulation on the low-pressure system, and there is a radiator below each cloak rack. The walls consist of a rustic ashlar base to the window sills, above which they are pink harled, giving the building a warm appearance. The windows, doors, tabling, finials, and chimneys are in dressed granite from Dunecht quarry. The contractors for the work were:—Mason, Mr. John Smith, Kintore; carpenter, Mr. William Buchan, Inverurie; slater, Mr. J. Farquhar, Aberdeen; plasterer, Mr. R. Moir, Inverurie; plumber and heating engineers, Messrs. James Laing & Sons, Inverurie; painters, Messrs. Ferguson & Co., Aberdeen. Messrs. M'Robbie & Milne, Aberdeen, supplied the desks; Mr. William Buchan the science and cookery fittings; and Mr. G. Gray, blacksmith, Monymusk, the railings and gates.

COUNCIL SCHOOLS, PENDLETON, SALFORD.—The Halton Bank Schools at Pendleton have just been opened. The architect was Mr. J. H. Woodhouse, and the builder Mr. J. Ramsbottom. The new buildings will contain accommodation for 1,120 scholars—boys' departments 450, girls' 390, and infants' department 280. The cost of the site and buildings is about 19,000*l*.

PROPOSED SECONDARY SCHOOL, YARDLEY.—The Higher Education Sub-Committee of the Worcestershire Education Committee, having further considered the question of the accommodation to be provided in the new secondary school at Yardley, have decided to erect buildings to accommodate 400 students at once rather than to follow the original proposal to build now for 280 students and subsequently extend to 400. They have accordingly directed the architect to prepare plans to show accommodation for 400 students.

PROPOSED KENNELS, BARNBY MOOR.—Plans have been prepared by Mr. G. A. Wilson, architect and surveyor to Earl Fitzwilliam, for new kennels to be erected at Barnby Moor. The buildings will be in brick from Lord Fitzwilliam's own Skiers Spring Brickworks, with tiled roofs, and the floors to the yards and lodging-rooms will be in concrete.

PROPOSED NEW OFFICES FOR THE BUSHEY URBAN DISTRICT COUNCIL.—Mr. R. H. Bicknell, M.Inst.C.E., Local Government Board Inspector, recently held an inquiry with reference to the Bushey Urban District Council's application to the Board for sanction to borrow 3,350*l*. for the provision of new public offices and stables in Rudolph-road. Mr. J. Wilson, Clerk to the Council, in the course of a statement regarding the application, said that the Council invited four architects to send in competitive designs, and the design submitted by Mr. Austin Durst was adopted, subject to small modifications. The loan of 3,350*l*. was made up as follows:—Cost of buildings, 2,690*l*.; furnishing, 230*l*., the rest of the amount being made up in fees, &c.

SWIMMING-BATH, HUCKNALL TORKARD.—A public swimming-bath has been erected at Hucknall Torkard from plans drawn by Mr. Fred Rowntree, architect, of London. The length of the swimming-bath is 75 ft. and the width 28 ft. There are six slipper-baths, a shower and foot bathroom, and fifty dressing-boxes.

ENLARGEMENT OF THE SOLDIERS' HOME, WOKING.—The Soldiers' Home in this town has been enlarged by the addition of a room, which will seat fifty people. The architect was Mr. A. Ernest Lacey, of Knaphill.

WORKMEN'S DWELLINGS, LIVERPOOL.—The Hornby-street artisans dwellings scheme for the erection of workmen's dwellings undertaken by the Liverpol Corporation has been completed. They comprise altogether three blocks, covering a total area of 27,600 yds., and upon this site there have been erected 453 dwellings, with seven shops, a superintendent's house and office, a recreation-ground ¼ acre in extent, and a shelter for the children during playing hours. The total expenditure on the land was 56,079*l*., and that for the buildings was 82,579*l*.

GOLF CLUB-HOUSE, TETTENHALL.—A new club-house is to be built for the South Staffordshire Golf Club on the Danes Court estate, Tettenhall. Mr. F. T. Beck, architect, of Wolverhampton, has prepared the designs.

Appointments.

POST OFFICE.—Sir John Gavey, C.B., late Engineer-in-Chief, has been appointed by the Postmaster-General as Consulting Engineer to the Post Office.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of Mr. A. J. Parsons and Mr. A. E. Clutterbuck as sanitary inspectors in the Metropolitan Borough of Fulham, as from January 15, 1908.

Sanitary and Engineering News.

ENGINEERING EXPERIMENT STATION, ILLINOIS.—Bulletin No. 16 of the Engineering Experiment Station of the University of Illinois has just appeared. It briefly presents the results of several years' study of trussed roofs by Mr. N. Clifford Ricker, Professor of Architecture. About fifty trusses of a selected type and of different proportions and arrangement were designed in long-leaf pine and steel, and changed until the assumed and actual weights of the trusses agreed. Other trusses were likewise designed in white pine and steel, and a few entirely constructed of steel. To perform this work as conveniently and as rapidly and accurately as possible it became necessary to devise simplified formulæ and tables, with a systematic method of treatment, all of which are fully explained in the pamphlet. The results illustrated are mostly shown in graphic tables for ready appreciation. The most important features are a new formula for the weights of trusses, per cent. of weight to be added for connexions, most economical ratio of depth to span of truss; distance between trusses, number of purlins per panel, and dimensions of panels. It was found that white pine and steel trusses are about 10 per cent. lighter than those of long-leaf pine and steel; also, that if carefully designed, steel trusses from 100-ft. to 200-ft. span have about the same weight as those of white pine and steel. Copies of this bulletin may be obtained gratis upon application to the Director, Engineering Experiment Station, Urbana, Illinois.

MANSFIELD GASWORKS.—Mr. A. G. Drury recently held an inquiry on behalf of the Local Government Board into an application of the Mansfield Corporation to borrow 1,100*l*. for the erection of a sulphate plant at the gasworks. The Council's proposals were explained by Mr. A. Graham, the gasworks manager.

HARROGATE WATER SUPPLY.—The tunnel in connexion with the new waterworks is now completed, so far as the borings are concerned, and water can now be discharged into the Irongate service reservoirs at Harrogate. The tunnel is from Roundhill, Masham, to Carlsmoor, and the borings have been carried out continuously for the past six years. The total length of the pipe line from Roundhill to the service reservoir is eighteen miles. No less than 4,500 yds. of this has been driven through a tunnel. The tunnel is 5 ft. 9 in. high, and 3 ft. 6 in. in diameter finished work. It has been carried through in a straight line, with a fall of 1 ft. 6 in. to the mile towards Harrogate. Mr. E. W. Dixon, the Waterworks Engineer to the Corporation, has been assisted in the work by Mr. G. F. Atkinson, as resident engineer at the Carlsmoor end, and Mr. Lewis Sykes resident engineer at Roundhill.

NEW WATERWORKS, BUCKIE.—The new waterworks at Buckie will be completed, it is expected, by the end of June next. Messrs. George Pirie & Son, Aberdeen, are the contractors, and the engineer is Sir W. R. Copland, Glasgow. The scheme when finished will cost between 11,000*l.* and 12,000*l.* The main features of the work consist of an embankment across the Bogfud burn ravine at a height of 60 ft. above the outlet pipe. There will be five filter-beds, each measuring 60 ft. by 45 ft. These are to be placed at the outside tail of the embankment on the north side, with all the necessary inlet and outlet walls and scour pipes.

NEW DOCK, METHIL.—It is announced, says the *Scotsman*, that the contract for the construction of the new dock has been placed with Messrs. Jas M'Alpine & Sons, Glasgow. The scheme of the engineers, Messrs. Blyth & Westland, provides for a new basin of 11 acres, double the size of the present docks, with two quays, at which the largest class of steamers can be loaded. The heaviest part of the contract will be the construction of the sea wall, which, starting from a point about 400 yds. west of the mouth of the River Leven, sweeps in a bold line, enclosing 15 or 16 acres, to the present dock sea wall, joining it where the parapet starts. The present entrance channel is to be utilised up to that point, and the new fairway will be cut through the pier, to run along the back of the present wall to the gates. A width of 80 ft. and a depth of 32 ft. will be provided. Most of the dock works are to be between high-water and low-water marks, but this only partially lessens the difficulties which the contractors have to face, the south-eastern exposure being the worst for storms. It is estimated that the new dock will cost half a million, while the approach railways, etc., will run up a further bill of 150,000*l.* Eight hoists of the most approved type and a new hydraulic plant on double the scale of the present plant will be provided. The North British Railway Company have arranged to provide about seventy houses for working men, who will have to remove from scheduled properties, and there is a great building boom along the Wemyss car line.

PROPOSED NEW SEWAGE WORKS, MELTON MOWBRAY.—On the 13th inst. Mr. H. Shelford Bidwell, Inspector of the Local Government Board, held an inquiry at the Town Hall, Melton Mowbray, respecting an application by the Urban District Council for sanction to borrow 20,000*l.* for purposes of sewerage and sewage disposal. Mr. E. Jeeves, Surveyor to the Council, gave evidence, and Mr. Herrington (representative of Messrs. Taylor, Sons, & Santo Crimp, engineers for the scheme) submitted the details of the new scheme.

Foreign.

FRANCE.—A Mutual Insurance Society, "La France Prevoyante," has opened a competition for Parisian architects for the erection of a large building on a plot of land between the Due du Temple and the angle of the Rue Dupetit-Thomas.——M. Morand, Director of the "Depôt des Marbres" on the Quai d'Orsay, Paris, has been appointed Director of the National School of Decorative Art, in place of the late M. Lajolais.——The jury of the Ecole des Beaux-Arts for the award of the Rougevin Prize, the subject for which was "Monument du Souvenir," have awarded the prize to M. Debat-Ponsan, pupil of M. Laloux.——M. Michel, architect, of Epernay, has been elected President for 1908 of the Society of Architects of the Department of La Marne; and M. Antoine has been elected President of the Society of Architects of the North of France.——The jury in the competition opened for the construction of a new Savings Bank at Chaumont have awarded the first premium to M. Perreau, architect, of Dijon, who is commissioned to carry out the work.——The Department of Travaux Publics has approved the line for the Canal du Nord, the cost of which is estimated at about 10¼ million francs for the portion to be first executed; the remaining work will require an expenditure of 17,000 francs.——The Municipality of Armonay have decided on the erection of a public abattoir, at a cost of 130,000 francs.——The Société Lyonnaise de Travaux Publics have drawn up a scheme for the derivation of the water of the Ain in order to create, above Lyons, a motive power of 12,000 to 13,000 horse-power. The cost of the operation is estimated at 25 million francs.

GERMANY.—Out of seventy-three preliminary designs entered for the competition for a hospital for Wurzen, the first premium was awarded to Herr Martin Herrmann, of Berlin-Wilmersdorf.——The Hotel Adlon, Berlin, in the Pariser Platz, has recently been built from the designs of Messrs. Gause & Leibnitz, at a cost of 21 million francs. It covers a site of 7,000 sq. metres, and has accommodation for 400 visitors. The halls and public rooms are copies taken from old French and English castles, and marbles, bronze, and foreign woods are much used in the decoration.——Director Högg, of the Bremen Institute of Architects and Engineers, suggests that the preservation of artistic features in town and country can only be effected by the appointment of æsthetic surveyors, who shall work hand in hand with local boards of works; the appointments to be temporary in nature, in order that no one style shall be permanently given the preference.——It is only in exceptional cases in Germany that artists are consulted in the building of workmen's dwellings. A brilliant exception is afforded by the model village built for Ulrich Gminder's factory hands near Reutlingen, Swabia, the designs for which were supplied by Professor Theodor Fischer. The village, which is not yet completed, consists so far of forty cottages to house two or three families each, two wash-houses, a store, an inn, and a club-house. The buildings are rough-cast, with half-timbering occasionally introduced; the roofs are steep pitched, and are of red tile.

AUSTRIA.—The Ministry for Railways has for some years past been considering the problem of housing the railway employees and providing them with cheaper and healthier quarters. In the immediate neighbourhood of the Western Terminus, Vienna, nine three-storied blocks will shortly be erected providing 144 dwellings, each dwelling consisting of a room, a closet, and a kitchen. The cost of erecting these blocks is estimated at 900,000 kronen, which sum will be advanced by the Provident Fund for Austrian Government Railway Servants.

DENMARK.—The well-known Danish architect, Meldahl, Chamberlain to the King, and President of the Academy of Arts, has recently died in Copenhagen, at the age of 82. His career may be summarised in the phrase, "From stonemason to Chamberlain." As a lad he worked on the building of the Thorwaldsen Museum, and gained the Gold Medal of the Academy of Arts, of which Institution he was later to be President during a period of thirty years. In this capacity he exercised great influence on the development of modern Danish architecture, being largely instrumental in re-introducing brick as a building material for general use. His principal works are the restoration of the world-famed Frederik'sborg Castle in Hillerød, and St. Frederik's Church, Copenhagen, the dome of the latter ranking among the finest of modern domes. He built also many important public buildings and a number of country seats in Sweden, besides being a prolific writer. His "History of Venice and Her Architecture" is particularly noteworthy.

RUSSIA.—As early as the XIIth century Sultan Sandschar is said to have built reservoirs for supplying the town of Merv with water and for irrigating the Loss Steppes. Remains of these works are still to be seen. In recent years the Russians decided to annex this no-man's land as Crown property, and to rebuild the dams and restore irrigation. In 1894 a dam and canals were constructed at a cost of 2·16 million marks. Two irrigation canals, fed by the Sir Daria, were also built to water the Hunger Steppes, and these works the Russian Government now propose to extend at a cost of 2·7 million marks. By next year 49,000 hectares (121079·000 acres) of this district should be under irrigation. At the end of last century 3 million hectares (over 7 million acres) of Russian Turkestan were artificially watered.

TURKEY.—The negotiations between the Turkish Government and the Anatolian Railway Company, concerning the draining and irrigating of the plain of Konieh, have been satisfactorily concluded. Between Konieh and Kargon lies a large tract of marshy, unproductive land, while the rest of the plain suffers so much from drought that it too lies fallow. The proposed works would yield an area of 55,000 hectares (13590·500 acres) of land for cultivation, and cost 20 million francs, which sum would be advanced by the railway company, and repaid in thirty-five years by the Turkish Government.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. J. Hatchard-Smith, architect, of 41, Finsbury-pavement, E.C., has taken his son into partnership. The firm will be known as Messrs. J. Hatchard-Smith & Son.——Messrs. Castle & Warren, architects, have removed their offices from "The Studio," Louvaine-road, S.W., to Talbot House, Arundel-street, Strand, W.C.

THE LONDON COUNTY HALL SITE.—An important arbitration is proceeding at the Surveyors' Institution, before Mr. Samuel Walker (Messrs. S. Walker & Son), with respect to the compensation to be paid to Messrs. Holloway Brothers (London), Ltd., by the London County Council for the firm's riverside works adjacent to Westminster Bridge, which are required as part of the site of the proposed County Hall for London. In opening the case, Mr. Morten, for the claimants, stated that in January, 1907, the firm sent in notice of the particulars of their claim as follows:—Land and buildings, 60,000*l.*; fixed machinery and fixtures, 15,000*l.*; removal of fixed plant, stock, and depreciation, 4,500*l.*; two years' rent of new premises, 4,500*l.*; principals' time during the two years used in organising the removal and fitting up in the new premises, 2,250*l.*; and loss of trade, 150,000*l.* The firm began business as builders and contractors in Battersea in 1882, and in 1898 they removed to the site in question, which they took on lease from the Ecclesiastical Commissioners. They reclaimed foreshore and constructed an embankment into the bed of the river, and eventually obtained a lease for 77¾ years, from Michaelmas, 1900, at 1,430*l.* per annum. The firm would not be able to get other premises from Battersea up the river, to East Greenwich down it, and the claim, as presented, included one and a half year's purchase of the profits at the works for trade disturbance and other items amounting in round figures to nearly 200,000*l.* Among the witnesses for the claimants were Mr. James Carmichael (Past-President of the London Master Builders' Association), Mr. Howard Martin (Messrs. Thurgood & Martin), Vice-President of the Surveyors' Institution, Mr. F. J. Terry Horsey (Messrs. Fuller, Horsey, Sons, & Cassell). Sir William Dunn, Mr. Leslie R. Vigers (Messrs. Vigers & Co.), and Mr. Howard Chatfeild Clarke (member of the Council of the Surveyors' Institution), the last named giving a valuation of 51,558*l.* for the premises, inclusive of the customary addition of 10 per cent. for compulsory sale, 5,478*l.* for two years' rent of site of new premises while being prepared for occupation, and adding items for superintendence of new works and buildings and for cost of removal and depreciation of plant and materials. To this had to be added such sum as might be found in respect of loss of profits by removal to new premises (one and a half year's purchase), his total, exclusive of the last item, being 61,552*l.* The first witness for the County Council was Mr. Andrew Young (Valuer to the Council), who put in a valuation amounting to 56,706*l.* It included 30,908*l.* for the leasehold interest, and 20,000*l.* for trade disturbance and inconvenience due to removal, together with certain sums to be paid when possession is given. The hearing was adjourned.

PHOTOGRAPHIC RECORD OF SURREY.—The Association for the Photographic Survey and Record of Surrey are to hold their annual meeting in the Electric Theatre at the Crystal Palace on March 14. The Association was formed a few years ago, to preserve a photographic record of all objects of interest in this very interesting county. Membership has increased, and already 3,000 prints are deposited in the Public Library at Croydon. A selection of 700 of these are to be exhibited in the south nave during the week following the 14th. For the week the following programme has been made out:—March 16, "Survey Work from the Geological and Scientific Standpoint," by Mr. W. Whitaker, F.R.S. March 17. "Notes on the Folk Lore and Primitive Appliances of Surrey," by Mr. Edward Lovett, F.R.H.S. (of the Folk Lore Society). March 18, "Ancient Architecture, Ecclesiastical and Domestic, in Surrey," by Mr. P. M. Johnston, F.R.I.B.A. March 19. "An Archæological View of Survey Work," by Mr. G. C. Druce. March 20, "A Naturalist's Ramble," by Mr. E. A. Martin, F.G.S. March 21. "Survey Photography," by Mr. Hector Maclean, F.R.P.S.

CANONBURY TOWER, ISLINGTON.—Concurrently with the demolition of Crosby Hall, the other London residence of the "rich Sir John Spencer" has recently been repaired under the

superintendence of Major Dance. The Marquis of Northampton, who is owner of the property, and whose ancestor William, second Lord Compton, married, in 1593, Eliza, the daughter and heiress of Sir John Spencer, intends to give Canonbury Tower and a new hall close by to the residents upon his estate in Islington for purposes of a club or institute. Sir John Spencer bought the manor-house in 1570 from Thomas, Lord Wentworth, and it is believed that he built the tower, of which, as well as of the manor-house erected by Prior Bolton of St. Bartholomew's-the-Great and the park and garden, we gave a short account in our number of September 7 last. In the closing years of the XVIIIth century John Dawes, of Highbury, a stockbroker, built most of the houses on the manor site; Canonbury-square was erected about twenty-five years afterwards. Sir John Spencer, elected Lord Mayor in 1594, kept his term of office at Crosby Hall (or Place). In St. Helen's Church, Bishopsgate, is the tomb—removed in 1867 from the St. Mary's Chapel into the "void," near the south door—which Lord Compton set up, 1610, to "his well-deserving father-in-law," with figures of Sir John Spencer, his wife, Alicia Bromfield, and their only child, who, wearing an immense hoop, kneels at a faldstool as if in penitence for having eloped with her husband from Canonbury.

DISFIGUREMENT OF THE MALVERN HILLS.—A special meeting of the Malvern District Council was recently held to further consider the Council's position with reference to the Bill promoted by the Conservators to prevent the disfigurement of the Malvern hills by quarrying. A motion to the effect that the seal of the Council be affixed to a petition to the House of Lords, praying to be heard in opposition to the Bill, and that the Clerk be authorised to take all necessary steps in support of such petition, was unanimously adopted, and it was also resolved to write to Colonel Heywood, Chairman of the Conservators, urging him to call an early meeting of his authority, so that their intentions with regard to the Bill might be clearly stated.

OPEN SPACES.—Lord Calthorpe has presented to Birmingham University about 20 acres of land, latterly used as a Volunteer rifle range, adjoining the new buildings and valued at 15,000*l.*, for purposes of a recreation-ground appertaining to the University. The Metropolitan Public Gardens Association have agreed to oppose the project (for which a Bill is prepared) to construct a tramway and motor-road from London to Windsor unless amendments are secured which shall frustrate the proposed spoliation of existing public spaces at Ravenscourt Park, Hammersmith, Stamford Brook Green, Back Common, Chiswick, and a recreation-ground in the Eton rural district, along the route through Chiswick, Brentford, Hounslow, and so by way of Colnbrook and Datchet to Windsor. The Association report that contributions are still required for the acquisition of 3½ acres of the Grove Hall Park at Bow (600*l.*), an additional plot of 12 acres to Ruskin Park, Denmark Hill (8,000*l.*), 9 acres in Barking-road, East Ham (1,800*l.*), and 30 acres in Gipsy-road, Norwood (2,000*l.*). Towards the first-named object promises have been made by the Poplar Borough Council (2,250*l.*) and London County Council (4,500*l.*) conditionally upon 2,250*l.* being subscribed by the public—9,000*l.* is asked for the land; and towards the land in Barking-road, for which 2,000*l.* is asked, the London Parochial Charities Trustees gave 1,000*l.*, a sum of 1,150*l.* being needed for fencing, draining, etc., and half the cost of a new road. Lord Eldon, who is about to dispose of his property at Shirley, near Addington, Surrey, has reserved a plot of about 4 acres as a playfield, provided the ground is fenced in and drained, and its upkeep is defrayed. A sum of 100*l.* is already forthcoming, and a further amount of about 150*l.* is needed for the preparation of the ground, whilst the cost of maintenance is estimated at 50*l.* per annum.

DISCOVERIES IN NEWGATE-STREET.—Interesting Roman and Norman relics have been brought to light during the excavations on the site of Christ's Hospital, in Newgate-street, in connexion with the extension of the General Post Office. Both the Society of Antiquaries and the London County Council officials have taken note of the discoveries, and measurements of the position and other particulars have been recorded. Several months ago the workmen came upon a portion of the old Roman wall which ran originally round the City, and the remains have since been found to extend for about 400 ft. under the site of the dining-hall, the direction being at right angles to Newgate-street. The wall itself has been destroyed and carted away, with the exception of one specimen piece. The rampart was about 8 ft. wide at the base and 7 ft. at the top, and its depth was 16 ft. The wall itself was of Kentish ragstone, and was very roughly built. It was strengthened with lime, and held together by several horizontal layers of tiles about 2 ft. 6 in. apart. The men also found many mediæval chalk wells, which were apparently part of the ancient Greyfriars Monastery. A large quantity of earthenware and other relics was found near the City wall, having, it is conjectured, been thrown on to the rubbish-heap as useless. Most of them were broken, and many were only scattered fragments.

DUBLIN GEORGIAN SOCIETY.—At a public meeting held in Dublin, at which the Countess of Aberdeen, wife of the Lord-Lieutenant, attended, it was resolved:—"That the Georgian Society for recording examples of XVIIIth century domestic architecture and decoration in Dublin be founded." It was explained by the Chairman that the object was to preserve as far as possible, by means of photographs or drawings, a record of the artistic decorative work in panels, ceilings, mantelpieces, etc., of the golden epoch of Dublin house-building.

PAVING WORKS IN SOUTHWARK.—At a sitting of the Southwark Borough Council on Wednesday last week, it was reported that the following streets had been selected as being most suitable and in need of asphalting during the coming year:—Trafalgar-street (Portland-street to South-street), 1,338*l.*; Orb-street, 931*l.*; Blendon-row (in front of new houses), 257*l.* 4s.; Elder-street (between Brandon-street and Rodney-road), 150*l.*; Catesby-street, 647*l.* 16s.; Surrey-square (from Flinton-street, west side, to Alvey-street), 1,484*l.*; Olney-street (including Alpha-street, from Walworth-road to Montpelier-street), 1,372*l.* 8s.; Iliffe-street (from Penton-place to Crampton-street), 1,164*l.* 16s.; Peacock-street (from Iliffe-street to Hodson-street), 470*l.*; St. Gabriel-street, 1,075*l.* 16s.; Brook-street (Temple-street to end of St. Gabriel-street), 270*l.*; Short-street, 629*l.* 8s.; Ufford-street, 390*l.* 16s.; Montague-street, 470*l.* 4s.; Webber-row (part of), 781*l.* 4s.; Union-road (part of), 722*l.* 4s.; Aylffe-street (part of), 136*l.*; Grosvenor-street (from Walworth-road to All Souls' Church), 1,877*l.* 8s.; Park-street (relay pitching), 240*l.* 8s.; Red-cross-street (relay paving), 91*l.* 8s.; total, 14,500*l.*

SPANISH ASPHALT AND CEMENT.—Reporting on the trade and commerce of Spain, Mr. S. P. Cockerell, Commercial Attaché to His Majesty's Embassy at Madrid, mentions that although there are innumerable so-called asphalt deposits in Spain they are chiefly in sandstone rock, and are not, therefore, strictly speaking, asphalt. There are only three companies working in Spain, and their aggregate output in 1905 (the last year for which figures are available) was only 5,655 tons. The asphalt mines of the Maestu Company are at Victoria. This company held, until within a few years ago, the contract for paving the streets of Madrid, which city has now about 50,000 metres of asphalt. There are projects for putting down asphalt at Valencia, at Granada, and at Barcelona. There might be an opening for wood paving in some of the more important towns if the effect on it of months of drought and heat could be overcome. These conditions make it contract, and when watered, or in the rainy season, the water gets underneath the blocks and makes it blister. Nevertheless, in Alicante—the only town with any extent of wood pavement—the streets thus paved have kept in excellent condition for a number of years. The Calle de Larios, Malaga, has wood paving which is a constant trouble, and wood is used on the broad walk of the Rumblade Cataluna, Barcelona. There are few other samples of wood paving in Spain. There are innumerable factories of natural cement in the country, and only five important factories of artificial cement; three of these have an arrangement—made in 1906—for regulating prices in the Spanish and Portuguese markets and for dividing them into zones. The numerous tile factories along the east coast of Spain use considerable quantities of cement. Spanish cement is now admitted for public works, and a good article is produced. Nevertheless, the import duty has been raised from 2 pesetas per ton to 5 pesetas (gold). A new law, dated February 14, 1907, enacts that in contracts for the account of the State for all kinds of services and public works articles of national production only shall be admitted, unless the Government rule that proposals may be submitted by foreign manufacturers on either of the following grounds:—(1) Owing to the imperfection of the national product; (2) owing to any notable difference in the cost of the national product in the place of production as compared with the foreign product; (3) owing to a recognised emergency which Spanish industry is unable to meet; (4) owing to the non-existence of the said industry in Spain. The origin of this new law is traced to many sources. It appears, at any rate, certain that among those pressing for such a measure were the Portland cement manufacturers, who have found themselves often excluded from Government contracts by foreign cements. The foreign cement most sold in Spain is that of a French firm, which has been largely used in public works. This firm has depôts all over the south of Spain. Trials to introduce British cement have been made, but freights for general cargo from London, as compared with those from Marseilles, to eastern and southern Spanish ports have made this impossible.

THE LATE SIR JAMES KNOWLES.—A correspondent writes that the building at the corner of Fleet-street and Chancery-lane, described in our obituary notice as the work of Sir James Knowles, was in reality that of his father, who was also an architect. On referring to our issue of August 18, 1855, in which the building was illustrated, we find the architect's name given on the engraving as "Mr. Knowles," the description in the text being followed by a long and very well-written communication signed "James Knowles, jun.," on the treatment of street architecture and the object aimed at in this design. "James Knowles, jun.," was, of course, the late Sir James Knowles, but it is possible that his father was the architect of the building, and that the son merely wrote the communication in respect of it.

BIRMINGHAM UNIVERSITY.—At the eighth annual meeting of the Court of Governors, held on February 20, Vice-Chancellor Beale, who presided in the absence of the Chancellor, Mr. Chamberlain, stated that the students' fees for last year amounted to 12,478*l.*, as compared with 10,568*l.* received in the last preceding period. On the general account there is an increase in the deficiency of about 1,000*l.* A large number of women students will be housed in a home at Bournbrook upon the foundation of a private benefactor, and the provision of residential quarters at Queen's College for students has been taken in hand. The engineering (having 255 students), mining, and metallurgical departments are now housed at Bournbrook, and the chemistry and physics' departments will be transferred thither in the course of the summer of next year.

INCORPORATED CHURCH-BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday, the 20th inst., at the Society's House, 7, Dean's-yard, the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.: Building new churches at Longsight, St. Anne, near Oldham, 120*l.*, and Norbury, St. Stephen, Surrey, 150*l.* for the first portion; and towards enlarging or otherwise improving the accommodation in the churches at Ealing, St. James, Middlesex, 40*l.*, making in all 115*l.*; Farnham, St. Laurence, near Salisbury, 10*l.*; Ilkeston, St. John-the-Evangelist, Derbyshire, 40*l.*; Princetown, St. Michael, near Lydford, Devon, 40*l.*, making in all 100*l.*; and Whittlesford, St. Mary and St. Andrew, near Cambridge, 20*l.* Grants were also voted from the special Mission Buildings Fund towards building mission churches at Balsall Heath, St. Luke, Worcs., 25*l.*; Charterhouse-on-Mendip, near Cheddar, Somerset, 20*l.*; and Luton, St. Saviour, Beds., 15*l.* The following grants were also paid for works completed:—Lower Halstow, St. Margaret, Kent, 15*l.* on account of a grant of 25*l.*; Rushden, St. Mary, Herts, 10*l.* on account of a grant of 20*l.*; Worlington, All Saints, Suffolk, 20*l.*, making in all 60*l.*; Chesterton, St. Michael and All Angels, near Peterborough, 15*l.*; Runwell, St. Mary, Essex, 50*l.*; Plaistow, St. Matthias, Essex, 200*l.*; Plaistow, St. Peter, Essex, 100*l.*, making in all 225*l.*; Marton, St. Margaret, near Lincoln, 10*l.*, on account of a grant of 20*l.*; Hill Croome, St. Mary, near Worcester, 35*l.*; Copnor, St. Alban, near Portsmouth, 40*l.*; Stratford, St. Aidan, Essex, 40*l.*; and Redfield, St. Peter and St. Paul, Bristol, 40*l.* In additions to this the sum of 180*l.* was paid towards the repairs of twenty churches from trust funds held by the Society. The grants voted towards mission buildings at this meeting have nearly exhausted the funds at the disposal of the Committee. Liberal contributions are earnestly invited both to the General and to the Mission Buildings Fund to enable the Committee to vote substantial grants and to continue the valuable work which this Society has so successfully carried on during the past ninety years. The annual General Court of the Society will be held on Thursday, May 21, at the Church House, at 3 p.m., when the chair will be taken by the Bishop of Oxford.

FRANCO-BRITISH EXHIBITION.—A section for the display of Scottish products and industries will constitute a feature of the British side of the Exhibition; and the Royal Scottish Academy have appointed a committee to undertake the selection of pictures to represent Scottish art. The Royal Scottish Society of Painters in Water Colours, the Society of

Scottish Artists, and the Scottish Modern Arts Association have forwarded a joint memorandum to the authorities of the Exhibition in the matter. It appears that as the space in the art building has been divided equally between France and Great Britain, the works by deceased artists of the British School will not exceed 100 paintings in oil and 100 in water-colour, and that there will be room for not more than 350 pictures of each kind by living British artists. The Indian pavilion will be erected at a cost of about 5,000*l.* after Mr. T. E. Hardy's designs, and the Paris Municipal Council intend to contribute objects of historical interest connected with the city of Paris, as well as plans, models, and literature to exemplify works and improvements they have carried out. The Metropolitan and Tube railways are constructing lines into the Exhibition grounds by means of a viaduct from Wood-lane and an elevated way from Addison-road, and a tunnel from Shepherd's Bush terminus respectively.

"THE LOTHIANS," HAMPSTEAD.—This freehold property is offered for sale. It stands on the east side of Fitzjohn's-avenue, lower end, at the corner of Belsize-lane, and contains a studio or music-room measuring about 50 ft. by 30 ft. The house was built by, we understand, Mr. Willett, for Mr. John Pettie, R.A., who carried out the more artistic portion of the scheme of interior decoration, and resided there until his death in 1893.

ROAD WORKS IN ISLINGTON.—At the sitting of the Islington Borough Council on Friday last week, it was resolved to pave with compressed asphalt the carriage-way of Drayton-park from Holloway-road to the north-eastern side of Benwell-road, and the carriage-way of Benwell-road, at an estimated cost of 4,450*l.*; and also to purchase the materials for repairing the macadamised carriage-way of Drayton-park, at an estimated cost of 510*l.* 16s.

THE SCOTTISH COLLEGE OF ARCHITECTURE, GLASGOW.—This college, situated at 108, Douglas-street, Blythswood-square, Glasgow, under the management of trustees, has been founded with the object of providing educational facilities for young men desirous of qualifying for examinations of outside educational bodies whose certificates are considered necessary in the obtaining of good building appointments. The premises comprise demonstration, lecture, model, and sample rooms, etc. A spring term of nine weeks commences on March 2. The principal of the college is Mr. D. Bennet Dobson, I.A., and amongst the subjects taught are masonry and brickwork, building construction, carpentry and joinery, sanitary science, and manual work. The fees are:—Single subject, 7s. 6d.; second subject, 5s.; additional subjects, 2s. 6d. each. Mr. William Dobson is the Hon. Secretary.

PROPOSED STREET IMPROVEMENTS, WORTHING.—An inquiry was recently held by Mr. Edgar Dudley, F.S.I., Inspector of the Local Government Board, into a petition by the Worthing Town Council for a Provisional Order to empower them to put into force the powers of the Land Clauses Acts, with respect to the purchase and taking of lands required for improvements and widening in Brighton-road, Chapel-road, Richmond-road, and Montague-street. The cost of acquiring all the property scheduled in the petition is estimated by the Borough Surveyor, Mr. F. Roberts, to cost 10,000*l.* or 12,000*l.*

HIGHLAND U.F. CHURCHES' BUILDING SCHEME.—The building scheme of the United Free Church for replacing churches and manses in districts where congregations and ministers have been dispossessed under the order of the Royal Commission, provides for the erection of nearly 100 churches, some of a temporary description, but thirty stone churches are required. Sixty manses are also needed to accommodate ministers and their families who have been evicted. Of the 150,000*l.* which it is hoped will be promised before the end of this year for carrying out the scheme, 55,500*l.* has already been subscribed.

COMBINED DRAINAGE.—The Chief Clerk of the St. Pancras Public Health Department, who is the Secretary of the Conference of Borough Councils promoting the Metropolitan Sewers and Drains Bill with regard to combined drainage, has reported to his committee that Mr. W. H. Dickinson, the member for North St. Pancras, has consented to take charge of and introduce the Bill in the House of Commons. The Bill is receiving good support from the members of Parliament representing the Metropolis. It is hoped that the President of the Local Government Board will favourably receive the Bill, it being pointed out that last April he stated that he was ready to consider any measure which might be introduced on behalf of the borough councils for dealing with the matter.

IRISH INTERNATIONAL EXHIBITION BUILDINGS.—As announced in our advertisement pages, Messrs. Wheatley Kirk, Price, & Co., engineering valuers and auctioneers, of Manchester, will offer for sale on March 11, at 11 o'clock, the Dublin Exhibition buildings. The Exhibition was held at Herbert Park, Ballsbridge, and the whole of the buildings will be sold where they now stand. The premises may be inspected any week-day during the hours of 10 a.m. and 4 p.m. Catalogues may be obtained from the Secretary, Mr. W. F. Dennehy, at the Executive Offices on the Exhibition grounds, or from the auctioneers.

NATIONAL GALLERY EXTENSION.—Mr. Stanley Wilson inquires in Tuesday's Parliamentary papers what firm is being employed to do the fire-proofing of the National Gallery extension, and whether the design and estimate were submitted to competition.—Mr. Harcourt, the Chief Commissioner of Works, replies that there will not be any special contract for fire-proofing. Reinforced concrete construction for both roofs and floors will be employed, and the work will form part of the ordinary building contract.

POST-OFFICE, MARGATE.—In the Parliamentary papers Mr. H. Marks asks the Postmaster-General if he can hold out any hope of a more commodious post-office building being provided for Margate. In reply Mr. Buxton states that a scheme for providing a more commodious building has already been sanctioned, and it is hoped to commence operations in a few months' time.

NECKER BRIDGE.—At the sitting of the Deptford Borough Council on Tuesday it was reported that the Improvements Committee of the London County Council were prepared to agree to the suggestions made by the Borough Council with reference to the provision of a fence to screen off the projecting railway bridge abutments on the western side of the northern approach; the modification of the footway at the entrance to Messrs. Dolton, Bournes, & Dolton's premises; the provision of a granite channel stone in the carriage-way on the up side of each approach, and the provision of a temporary footbridge across the canal; but that they were not prepared to accede to the Council's suggestion to provide new gullies in the approaches, nor to the conveyance of the old materials to the Council's yard.

STREET WIDENING IN DEPTFORD.—On Tuesday the Deptford Borough Council decided that, subject to the London County Council giving its consent, the freehold and leasehold rights in the forecourt between Nos. 156 and 162, Church-street, be purchased for the purpose of widening the road.

METROPOLITAN IMPROVEMENTS: 1808-1907.—Several items which the *Times* recently reprinted from its issue of just 100 years ago evince what were the current ideas and conceptions concerning projected changes in London at that time, and recall how some of the improvements either have suffered subsequent alteration or were but imperfectly accomplished. For instance, one paragraph announces that a stone mansion in Piccadilly "is to be completed as a splendid hotel. It will be the most sumptuous edifice of that description in London." The mansion was that which Novosielski, a Polish architect, built for the Earl of Barrymore, who died before its completion. The site, we may mention, taken for the house had been that of Carter's—one of the many statuary yards formerly in Piccadilly—on the Stratton estate. The house, opened as the Pulteney Hotel, was rebuilt in 1850-1 from the ground floor, the Portland stones being used again, by Sir Robert Smirke for the Marquis of Hertford, who, however, never inhabited it, and devised it to the late Sir Richard Wallace. The house, No. 105, became the residence of Sir Julian Goldsmid, Bart., whose famous art collection was dispersed at Christie's in 1896; in the following year it was rented by the Isthmian Club. Of the plans "for converting the King's Mews (at Charing Cross) into an elegant square," the *Times* observes that "the grandest architectural trait in such an improvement . . . would be the introduction of a view of the west front of St. Martin's Church . . . now so disgracefully blocked up." Another item relates to internal improvements of Grosvenor House, "much mended, too, by being entirely covered with the modern cement." Grosvenor, formerly Gloucester, House was originally built for the Duke of Beaufort, who died in 1803. The house was then bought by the Duke of Gloucester, who sold his interest in the lease to Robert, second Earl Grosvenor, who, in 1831, was created Marquis of Westminster. For the Marquis of Westminster Salvin carried out extensive alterations in 1835, and T. Cundy, seven years afterwards, added the west wing or picture-gallery facing Park-lane, and the Roman Doric colonnade or screen fronting Upper Grosvenor-street. Whilst the King's Mews is by some attributed to Kent, it appears that Lord Burlington rearranged the buildings for George II. in 1732, and that he designed the south elevation of the State horses' stabling which is delineated in Wales's print of about 1750, which was reproduced in the *Builder* of January 17, 1903. There is also a good view by T. Malton, published on December 30, 1794.

LAMBETH COUNCIL.—At the Lambeth Borough Council on Thursday last week plans were approved for the combined drainage of three blocks of buildings. The application was made on behalf of the Duchy of Cornwall. The whole of the drainage will be taken outside the buildings.——With regard to the proposed underground convenience in the triangular detached portion of Kennington Park, it was decided to construct it elsewhere if the County Council persists in the demand that there shall be free accommodation. The cost of the proposed convenience, it was stated, would be 2,824*l.*——In connexion with the work at the North Lambeth Library caused by subsidences owing to the tunnelling of the Bakerloo tube, it was agreed to appoint Messrs. John Leaning & Sons as quantity surveyors, at a fee not exceeding 2½ per cent., and to appoint a clerk of works.——On behalf of the Corporation of Wardens of St. Saviour's, Southwark, Messrs. Langston & Co. sought consent for the erection of additions to the St. Saviour's almshouses, Hamilton-road, West Norwood. As the additions would disturb the existing building line on the western side of Hamilton-road, it was agreed to advise the County Council to refuse the application.——It was stated that arrangements had been made for the early removal of the hoarding around the new town hall at Brixton so that the work of paving might be at once put in hand.

THE FIRE AT MESSRS. HOLLOWAY'S.—We understand that the fire which took place at the works of Messrs. Holloway Brothers, in Belvedere-road, on Tuesday evening last, was (owing mainly to the promptness and energy displayed by the Fire Brigade) practically confined to the destruction of one stack of timber, the buildings not being affected in any way, and business was resumed without any interruption whatsoever on the following morning. Reports in some of the daily papers would have led to the idea that the fire was most serious, but this, fortunately, was not the case.

Capital and Labour.

STATE OF THE BUILDING TRADES.—Employment in January continued slack. It was worse than a month go, and still worse than a year ago. Returns from 788 firms employing 40,486 workpeople show that, compared with a month go, there was a decrease of 2·2 per cent., and compared with a year ago a decrease of 9·1 per cent. in the total number of workpeople employed. In London the decrease compared with December was very slight, but compared with a year ago there was a decrease of 16·2 per cent. In the provinces there were decreases of 3·1 per cent. compared with a month ago, and of 5·1 per cent. compared with January, 1907. The percentage of trade union carpenters and joiners unemployed at the end of January was 11·1, as compared with 10·7 a month ago, and 8·2 a year ago; and for plumbers, for the same dates, 9·0, 9·0, and 6·7 respectively.—*Labour Gazette.*

Law Reports.

ARCHITECT'S ACTION AGAINST BARRISTER FOR LIBEL AND SLANDER.

THE hearing of the action of Hunt *v.* Schultess Young, which was fully reported in the *Builder* of last week, was concluded before Mr. Justice Darling and a special jury in the King's Bench Division on the 21st inst.

It will be remembered that the plaintiff, Mr. W. G. Hunt, an architect, brought the action against the defendant, Mr. Schultess Young, a barrister, for damages for alleged defamatory statements uttered and published by the defendant charging the plaintiff with having bribed certain members of the Council in order to obtain employment by the Council. The defence set up was that the alleged libels and slanders were uttered and published on privileged occasions, and were fair comment on a matter of public interest, having been published and spoken by the defendant without malice.

Mr. Montague Lush, K.C., and Mr. Newbolt appeared for the plaintiff; and Mr. Hugo Young, K.C., and Mr. Wills for the defendant.

On Thursday Mr. J. F. Shillaker, who became a member of the Acton District Council, said that in March last, at a meeting of the Council, he heard the defendant make a

statement to the effect that the plaintiff had paid 200*l.* to Mr. Monson, jun., so as to secure the influence of Mr. Monson, sen., to get the Council's nomination.

Mr. E. P. C. Monson, jun., gave evidence that, according to an agreement, he received 200*l.* from the plaintiff for making certain sketches and generally assisting him in the scheme of plans for the new municipal offices. Witness denied that plaintiff ever offered him money to secure his father's interest for obtaining the nomination. Such a matter was never mentioned in any way.

Cross-examined: He now wished that from the very first he had insisted upon being associated with the plaintiff in the preparation of the design. He regretted that this was not done, for when it all came out, he had been held up to the ratepayers of Acton as a scoundrel, whereas everything was really open and above board.

At the close of the plaintiff's case Mr. Hugo Young proceeded to address the jury on behalf of the defendant. He said that they had nothing to do with the question whether the plaintiff was justified in taking the son of a member of the Council without premium, or whether another member's son did or did not do adequate work for the 200*l.* he received from the plaintiff. He contended that the conduct of the competition and the preparation of further plans at the cost of the ratepayers were legitimate matters for discussion and comment before the Council and the ratepayers at the time of the election. He pointed out that the defendant had no personal feeling towards the plaintiff. The defendant had not infringed the law because he happened to make a slip when he thought he was telling the truth.

Mr. Henry Schultess Young, the defendant, was then called, and, examined, said he had been about sixteen years at the Bar. He had been Chairman of the Acton Ratepayers' Association for about four or five years. He had had nothing personally to do with the surcharging of the 1,500*l.* If the old Council had sealed the contract for 35,000*l.* before the election none of the members of the old Council would have been returned. He wished to stop the sealing of the 35,000*l.* contract because the ratepayers were so strongly opposed to it; but he (witness) had no feeling of animosity towards the plaintiff. Personally, the plaintiff was an absolute stranger to him. At the interview he had with the plaintiff, plaintiff told him he had taken young Mr. Baldwin into his office as pupil without a premium, and witness understood him to say that it was a thing he had never done before. Plaintiff afterwards added that he did not know what had induced him to do that.

The defendant, cross-examined by Mr. Lush, said, he told the Council he did not think it fair to penalise the plaintiff for the mistakes of the Council.

Did you mean on April 23 that Mr. Hunt was to be appointed by the Council to be the architect under the new scheme?—I hoped that would be a happy solution of the difficulty.

I want to ask you if, on April 23, you knew of anything against the character of Mr. Hunt which should prevent the Council employing him?—Nothing.

Did you think that on August 20 Mr. Hunt had tried to bribe Mr. Baldwin?—No.

Did you believe in September that Mr. Hunt had offered money to Mr. Monson's father for his influence?—I believed that he had offered a sum of money to young Mr. Monson *ex post facto* for his father's interest.

Do you now believe that the plaintiff tried to bribe either Mr. Baldwin or Mr. Monson?—Mr. Baldwin, no, certainly not; but with regard to Mr. Monson, frankly, I do not know. On the whole, my opinion now is, if anything, favourable to Mr. Hunt.

About this appointment with Mr. Hunt. Did you arrange for Mr. Crane to be there by letter?—Yes; I wanted Mr. Crane to be there to hear that nothing improper was said on either side.

Is it true that you refused to see the plaintiff without another councillor being present?—Yes, that is so.

The plaintiff's account of the first interview between you is, I take it, according to you, untrue?—It is inaccurate! I regarded it in the light of a refusal of an interview.

May I ask why you wanted Mr. Crane to be there as a witness?—I thought it would be more in accordance with the orders of the Council if he were there.

Now, you have your notebook there. Is not the most important entry there the fact that he had said "he had never done so before"?—No; I thought the most important thing was the fact that he had a councillor's son in his office as pupil, and had taken no premium.

Do you mean to tell us that the persons who heard your story would not infer that the plaintiff had been corruptly acting?—I did not think so. I had no reason to think so.

Then, may I take it that all these remarks referring to Mr. Baldwin made at the meeting were not intended to reflect on plaintiff's character?—Yes.

Cross-examined as to the letter sent to the Royal Institute of British Architects on August 15, the witness said that what he meant to convey was that the plaintiff had deliberately refrained from having the contract sealed. He said the plaintiff did not have it sealed, knowing that if he had done so he would have offended his friends on the Council who wanted it kept quiet. If the old members had had it sealed, not a single man of them would have been elected on the new Council. He did not mean by the letter to the Institute that there was anything discreditable or dishonourable in what Mr. Hunt had done.

At the commencement of the resumed hearing on Friday, his Lordship informed counsel that he should certainly hold that the occasions on which defendant had uttered the words complained of were privileged. The only question the jury would have to decide was whether Mr. Schultess Young made use of a privileged occasion to gratify some private spite or malice.

Mr. A. W. W. King, a Middlesex magistrate, said he was a member of the Acton Urban District Council up to 1907, when he retired. He remembered having a conversation with Mr. Baldwin, who was then Chairman of the Council, in December, 1906, respecting a rumour that one of Mr. Baldwin's sons was in plaintiff's office. He urged that gentleman, as a public man, to mention the matter at a meeting of the Council. Mr. Baldwin was very indignant, but witness could not say whether he declined to adopt the suggestion, but, as a matter of fact, he did not act on it.

Mr. Schultess Young, who was recalled, stated that, unfortunately, he was bearing the whole brunt of that litigation.

His Lordship: Now that the whole of the facts of this matter are out, cannot counsel give their clients some sort of advice?

After some time spent in consultation, Mr. Lush informed his Lordship that he was happy to say that the parties had come to what he hoped would be thought a very reasonable and sensible arrangement. On behalf of Mr. Hunt, he desired to say that he entirely withdrew any imputations made upon Mr. Schultess Young. For his own part, counsel had never made any suggestion or intended to suggest anything against Mr. Schultess Young's honour or integrity. He had only suggested that defendant's recollection was at fault.

Mr. Hugo Young said he was willing that it should be a drawn battle, and that the parties should cry peace. He desired to be perfectly generous in the matter. It had been alleged against Mr. Schultess Young that he had charged Mr. Hunt with something discreditable—the word corrupt had been used—between Mr. Baldwin and himself, and Mr. Monson and himself. Mr. Schultess Young not only withdrew any such suggestion, but went further, and said he merely sought inquiry, and did not definitely frame any charge against Mr. Hunt. He did not desire at that moment to let any imputation rest upon Mr. Hunt's honour in connexion either with the matter of Mr. Baldwin or of Mr. Monson. Mr. Schultess Young had been actuated by no malice, and if he had erred in any way he regretted it. Counsel wished to withdraw on behalf of Mr. Schultess Young in the fullest possible way any imputation upon Mr. Hunt's honour or integrity.

His Lordship thought the parties were to be congratulated upon having taken so sensible a view of the question. It was, he said, just as well that it should have been fought out in open Court, because it was plain that there were a number of people, where there was no evidence of wrong-doing, who were ready to suppose that something wrong had been done. For example, the fact that Mr. Baldwin's son entered the office of Mr. Hunt, and that Mr. Hunt did not take a premium, obviously had given rise to the suspicion in the minds of a number of people that both Mr. Hunt and Mr. Baldwin had done something wrong. The matter had been investigated, and it was perfectly clear that neither did anything wrong. In his Lordship's opinion, that inquiry had ended happily in that it had enabled Mr. Baldwin, among others, to say that all suspicions which were directed against him were quite baseless. He did not wonder at the misunderstanding which had arisen between plaintiff and defendant; but he hoped that the investigation which had been openly held would satisfy everyone that nothing wrong had been done, either by Mr. Hunt or Mr. Schultess Young, or by the other people whose conduct was suspected.

A juror having been withdrawn, the matter terminated.

APPORTIONMENT OF STREET EXPENSES.

In the Court of Appeal, before the Master of the Rolls and Lords Justices Moulton and Buckley, on the 25th inst., the hearing was concluded of the case of the Mayor, etc., of Hampstead *v.* Western, on the application of the defendant for judgment or new trial on appeal from verdict and judgment at the trial before Mr. Justice Darling and a special jury in the King's Bench Division. (The case was reported in the *Builder* of December 14 last.)

The action was brought by the plaintiffs against the defendant, a builder, to recover the sum of 118*l.* 8*s.* 7*d.*, being the defendant's portion of making up a new street called Gondar-gardens, Hampstead.

The plaintiffs' case was that the road in question was made up in accordance with resolutions passed by the plaintiffs at a cost of about 2,000*l.*, and the expenses were apportioned between the owners of property in the road, and the defendant was apportioned the amount claimed in the action as the owner of property abutting upon the said road.

The defendant set up as a defence that there was a strip of land between the roadway and the defendant's property, which strip, it was said, had been taken from the Grand Junction Waterworks Company, and therefore he said he was not liable for the expenses of making up and paving the new street. At the trial the learned judge, upon the answers of the jury to questions specifically left to them, entered judgment for the plaintiffs for the amount claimed, but granted a stay of execution on the usual terms with a view to the present appeal.

Mr. Younger, K.C., and Mr. David appeared for the appellant, and Mr. Macmorran, K.C., and Mr. Courthorpe-Munroe for the respondents on the appeal.

At the conclusion of the arguments of counsel, their Lordships suggested that the parties should endeavour to arrive at a settlement of the dispute, and in the result, after a short consultation, it was announced that by consent no order should be made upon the appeal upon terms which were not disclosed.

The Master of the Rolls expressed his approval of the course which had been adopted.

Patents of the Week.

APPLICATIONS PUBLISHED.*

2,357 of 1907.—R. H. McHARDY and J. McHARDY: *Bolts for Doors and the like.*

This relates to bolts for doors and the like, and consists in the combination of a locking plunger adapted to work through a hole in the bolt proper, and to take into any one of a plurality of openings or recesses in the base of the casing, and a spring arranged to normally force said plunger into its locking position in relation to the base of the casing or barrel, said plunger being withdrawn to unlock same in opposition to said spring.

2,611 of 1907.—J. McHARDY: *Casement Sash-stay or Holder Applicable also to Analogous Purposes.*

This relates to a casement sash-holder applicable to analogous purposes, consisting in a split resilient tubular member having part of its length of an elliptical cross-section, and the other part of circular cross-section, a hinge on one end of said tubular member, a ferrule on the other end of said member, a telescopic rod of circular cross-section for the greater part of its length, and elliptical in cross-section for the remainder of its length, and arranged to be locked or firmly held at the desired point of adjustment by giving it an approximate quarter turn in opposition to said tubular member.

3,520 of 1907.—C. H. PEARSON: *Pipe and like Joints or Connexions.*

This relates to pipe and like joints or connexions, and more particularly to the joints of the pipes or conduits used in electric wiring systems, and comprises the use of a spring band or collar having a lug or lugs or projections on its inner surface adapted to be placed on the end of the outer of the two pipes, conduits, or the like to be connected together, or over the socket or fitting employed for such connexion, the outer pipe or socket being provided with a slot or slots through which the said lugs or projections pass for gripping the end of the inner pipe when the spring band or collar is tightened.

4,617 of 1907.—W. E. A. JENNINGS: *Door Bolt that can be Locked or Fastened.*

This relates to a door bolt having a screwed spindle passing through one end of it, the screwed spindle having a lever passing through one end, the lever having screwed adjustable

* All these applications are in the stage in which opposition to the grant of patents upon them can be made.

PATENTS.—*Continued on page 260.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xviii; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur.**

Competitions.

* MAY 23.—**Devon.**—SCHOOL.—The Governors of the Tiverton Middle Schools invite competitive designs from architects for a new school for boys and girls, to accommodate 200 scholars, and cost about 6,000*l.* Premiums of 50 and 25 guineas for first and second respectively. For further particulars see advertisement in this issue.

* NO DATE.—**Luton.**—SCHOOL.—The Luton Education Committee invite designs for new Elementary School. Architects desiring to compete in a limited competition should submit their names to the Secretary of Education, Town Hall, Luton, before 10 a.m., March 9. For further particulars see advertisement in this issue.

Contracts.

BUILDING.

FEBRUARY 28.—**Hanley.**—PREMISES.—The erection of new office premises in Hanley. Names to Messrs. Elijah Jones, M.S.A., & Jackson, architects, Hanley.

FEBRUARY 29.—**Blaenavon.**—HOUSE.—The erection of a house at Blaenavon, for the Blaenavon Company, Ltd. Names to Messrs. Teather & Wilson, F.F.R.I.B.A., architects, Andrews'-buildings, Queen-street, Cardiff.

FEBRUARY 29.—**Halstead.**—SCHOOL.—The erection of a school at Halstead for the Governors of the Halstead Grammar School. Application to the architects, Messrs. Goodey & Cressall, High-street, Colchester.

MARCH 1.—**Cullompton.**—FARMHOUSE.—The erection of a new farmhouse at Lower Upton, Cullompton. Plans, etc., may be inspected at the offices of Messrs. T. E. Ayre & Co., Bampfylde-mews, Exeter.

MARCH 1.—**Rathmore.**—PLAY SHED.—Tenders for erecting a play shed and asphalting the playground in Rathmore Convent School, Co. Kerry. Plan and specification to be seen at Convent.

MARCH 2.—**Glenagery.**—HALL.—The erection of a Parochial Hall at Glenagery for the Select Vestry of St. Paul's Church, in accordance with plans and specification prepared by Messrs. W. M. Mitchell & Sons, architects, 2, Stephen's-green, Dublin. Bills of quantities have been prepared by Messrs. Patterson & Kempster, and can be had from them on payment of 1*l.* 1s.

MARCH 2.—**Liskeard.**—WORKS AT SCHOOLROOM.—For alterations and repairs to the basement, schoolroom, etc., of the Liskeard Wesleyan Chapel. The plans, etc., can be seen at office of Mr. John Sansom, F.R.I.B.A., architect, Liskeard.

MARCH 2.—**Musselburgh.**—SCHOOL ADDITIONS.—Musselburgh School Board invite tenders for additions to Fisherrow School. Applications for schedules must be made to the architects, Messrs. Lyle & Constable, 3, Hill-street, Edinburgh.

MARCH 2.—**Old Deer.**—SCHOOL.—The mason, carpenter, slater, plasterer, plumber, and painter works of a new school and higher grade department to be erected in the village of Old Deer for the Old Deer School Board. Plans may be seen with, and schedules of quantities obtained from, Messrs. Sutherland & George, architects, 26, Crown-street, Aberdeen. Plans may also be seen at the School Board Office, Old Deer.

* MARCH 2.—**Romford.**—INFANTS' SCHOOL.—The Essex Education Committee (Romford L.A.S.C.) invite tenders for an infants' school at Romford. For further particulars see advertisement in this issue.

MARCH 2.—**Thrapston.**—SCHOOL.—Northamptonshire C.C. Education Committee invite tenders for the erection of a new school at Thrapston, in the County of Northampton. Application for quantities to the architect, Mr. J. T. Blackwell, High-street, Kettering. A deposit of 1*l.* 1s. will be required.

MARCH 2.—**Wallsend.**—COTTAGES.—The Wallsend Industrial Co-operative Society, Ltd., invite tenders for the erection of ten pairs of semi-detached cottages on Model Cottage Exhibition Estate, Walker Gate. Plans, etc., prepared by Mr. Ed. Cratney, architect, 35, High-street, Wallsend, and Messrs. T. E. Davidson & Sons, architects, Pearl-buildings, Newcastle-on-Tyne, may be seen, and form of tender will be supplied, at the Board-room, Frank-street, Wallsend.

MARCH 2.—**Winchester.**—REPAIRS TO COTTAGES.—Winchester Cottage Improvement Society invite tenders for repairs to some thirty cottages in different parts of Winchester. Specifications can be obtained from Mr. J. Ashton Sawyer, Chartered Surveyor, Winchester.

MARCH 3.—**Aylesbury.**—SCHOOL.—Bucks County Education Committee invite tenders for the erection of a new Elementary School at Dagnall (Edlesborough Parish) to accommodate sixty children. Apply to Mr. C. G. Watkins, Education Secretary, Education Office, Aylesbury.

MARCH 3.—**Blaenrhondda.**—LIBRARY, ETC.—The erection of workmen's library and institute at Blaenrhondda, Treherbert, for the Tydraw Colliery Workmen's Committee. Names to Mr. W. D. Morgan, M.S.A., architect, 194, Ystrad-road, Pentre, together with a cheque for 2*l.* 2s.

MARCH 3.—**Burnham.**—ALTERATIONS, ETC., TO FIRE-STATION.—Burnham P.C. invite tenders for alterations and additions to the Burnham Fire-station, Parish-room, etc., in the High-street, Burnham. Drawings can be seen, specifications, etc., obtained, from Mr. J. T. Jacka, architect, Brawell-road, Burnham, upon payment of 1*l.* 1s.

MARCH 3.—**Great Yarmouth.**—OFFICE BUILDINGS.—The erection of new office buildings in Regent-street, Great Yarmouth. Plans and specifications prepared by Mr. R. Scott Cockrill, A.R.I.B.A., architect, Crossley House, Lowestoft. Quantities will be supplied by the architect on application.

MARCH 3.—**Preston.**—DOMESTIC SCIENCE SCHOOL.—The Council of the Harris Institute, Preston, invite tenders for the proposed extension of the School of Domestic Science, Glover's-court, Preston. Copies of the specification, etc., may be obtained from Mr. F. J. Pye, Technical School, Corporation-street, Preston, upon deposit of 2*l.*

MARCH 4.—**Darlington.**—TEA HOUSE.—The Corporation invite tenders for the erection of a rustic tea house at the Public Park. Plans, etc., may be seen on application at the offices of Mr. George Winter, Borough Surveyor, Town Hall.

* MARCH 4.—**Hampstead.**—LAUNDRY ALTERATIONS.—The Metropolitan Asylums Board invite tenders for new packing and receiving rooms to the laundry at N.W. Fever Hospital, Hampstead, N.W. For further particulars refer to an advertisement in this issue.

MARCH 4.—**Menston.**—RESIDENCE.—The various works required in the erection of a detached residence at Menston for Mr. C. W. Curran. Messrs. Rogerson & Dawson, architects and surveyors, 40, Sunbridge-road, Bradford.

MARCH 4.—**Preston.**—ADDITIONS, ETC.—Manchester Education Committee invite tenders for the additions and alterations to the corrugated iron building at Mauldeth-road Municipal School, Withington, Manchester. Plans, etc., may be obtained at the Education Offices, Deansgate, Manchester, on a deposit of 1*l.* 1s. Cheques to be made payable to the Accountant, Education Offices, Deansgate, Manchester.

MARCH 6.—**Belfast.**—MANSE.—A manse at Upper Falls, in connexion with the Broadway Presbyterian Church, for the Rev. J. W. Gibson, A.M. Plans, etc., can be seen at office of Messrs. Young & Mackenzie, Scot. Prov.-buildings, Belfast.

MARCH 6.—**Brampton Bierlow.**—SCHOOL.—West Riding C.C. Education Committee invite whole or separate tenders in connexion with the enlargement of cloak-room and general repairs, Cortonwood Provided School, Brampton Bierlow. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent to him direct at the County Hall, Wakefield.

MARCH 6.—**Sharlston.**—ALTERATIONS TO SCHOOL.—The West Riding Education Committee invite tenders for alterations and repairs, new Sharlston Provided School, Sharlston. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent to him direct, at the County Hall, Wakefield.

MARCH 6.—**Silkstone.**—SCHOOL.—West Riding C.C. Education Committee invite tenders for Silkstone new school, near Barnsley. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent to him direct, at the County Hall, Wakefield.

MARCH 6.—**Tadcaster.**—PARTITIONS, ETC.—The West Riding Education Committee invite tenders for erection of glazed partition and repairs, Tadcaster West Provided School. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* 1s. is required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent to him direct, at the County Hall, Wakefield.

MARCH 7.—**Caerau.**—ADDITIONS.—Additions to the Caerau and Spelters Co-operative Society, Ltd., Caerau, near Bridgend. Plans, etc., may be seen at the Stores and at office of Messrs. Evans & Jones, architects, 5, Station-road, Port Talbot, and Llanelly, where quantities may be obtained on deposit of 2*l.* 2s.

MARCH 7.—**Haslingden.**—ERECTION OF A COUNCIL SCHOOL AT HELMSHORE.—Plans may be seen, and specifications, etc., obtained, on application at the office of the Borough Surveyor, Mr. J. S. Green, on payment of a deposit of 1*l.* 1s.

MARCH 7.—**Haslingden.**—SECONDARY SCHOOL.—Haslingden T.C. invite tenders for the extensions to school. Plans may be seen, and specifications, etc., obtained, on application at the office of the Borough Surveyor, Mr. J. S. Green, on payment of a deposit of 1*l.* 1s.

MARCH 7.—**Lleyn.**—CHAPEL, ETC.—The erection of a new independent chapel and house at Hebron, Lleyn. Plans, etc., to be seen at office of Mr. Watkin Williams Jones, architect and surveyor, Salem-place, Pwllheli.

MARCH 7.—**Penzance.**—CHURCH HOUSE.—The erection of a church house, etc., at Penzance, in connexion with St. John's Church. The drawings, etc., may be seen by appointment at the offices of the architect, Mr. Oliver Caldwell, F.R.I.B.A., Penzance.

* MARCH 7.—**Tottenham.**—HOUSE, ETC.—The Tottenham Education Committee invite tenders for:—(1) Erection of caretaker's house, latrines, playsheds, boundary walls, etc., on new school site in Crowland-road; and (2) alterations and additions to Coleraine Park Schools. For further particulars see advertisement in this issue.

MARCH 7.—**Winscombe Woodborough.**—CLOAK-ROOM.—Somerset C.C. County Education Committee invite tenders for the erection of a new cloak-room at the Winscombe Woodborough Council School. Plans, etc., can be seen at the school, and further information obtained from the architects, Messrs. Price & Jane, Waterloo-street, Weston-super-Mare.

MARCH 9.—**Dublin.**—COTTAGE.—Great Northern Railway Company (Ireland) Directors invite tenders for the erection of a four-roomed cottage—alternative designs—at Drumclay level crossing, north of Enniskillen. Drawings and specifications at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street Terminus, Dublin; or copies of them at the offices of the District Engineers, Belfast and Enniskillen. Forms of tender on payment of 1s. per set (not returnable).

MARCH 9.—**Ebbw Vale.**—CHURCH.—The erection of a church to seat 500 and Parish-hall at Ebbw Vale, Mon., for the Rev. F. Williams, Vicar, and Committee. Plans can be seen at the Clergy House, Ebbw Vale, and at offices of Mr. G. E. Halliday, F.R.I.B.A., 19, Castle-street Cardiff.

MARCH 9.—**Hopkinstown.**—SCHOOL EXTENSION.—Pontypridd Education Committee invite tenders for extension of Hopkinstown Infant School. Plans, etc., may be seen at the office of the Surveyor to the Council, on payment to Mr. D. Milton Jones, Secretary to the Education Committee, Municipal-buildings, Pontypridd, of 3*l.*

MARCH 10.—**Croydon.**—CONVENIENCE.—Croydon Corporation invite tenders for the erection of a convenience at Thornton Heath Pond. Plans can be seen, and specification, etc., obtained, at the office of the Borough Engineer, Town Hall, Croydon, upon payment of a deposit of 1*l.* 1s.

MARCH 10.—**Maindy.**—VILLA.—The erection and completion of a villa residence at Maindy, Ton Pentre, for Mr. Daniel Thomas, Pentre. Plans, etc., may be seen at office of Mr. W. D. Morgan, M.S.A., architect, 194, Ystrad-road, Pentre.

* MARCH 12.—**Ramsgate.**—POST-OFFICE.—The Commissioners of H.M. Works, etc., invite tenders for new post-office at Ramsgate. For further particulars refer to an advertisement in this issue.

* MARCH 12.—**Stafford.**—SCHOOL EXTENSION.—The Staffs Education Committee invite tenders for enlargement of Stafford Corporation-street Council School. For further particulars see advertisement in this issue.

MARCH 14.—**East Looe.**—CONVENIENCE.—The erection of a public convenience at Church End, East Looe, for the Looe U.D.C. Plans, etc., can be seen at office of Mr. John Sansom, F.R.I.B.A., architect, Liskeard, or at Looe by arrangement with Mr. L. Cook.

MARCH 14.—**Halifax.**—SHOPS.—For the erection of three shops at the junction of Rawson-street and Powell-street, Halifax. Plans may be seen, and bills of quantities obtained, upon application at offices of Mr. Thos. Kershaw, A.R.I.B.A., architect, L. and Y. Bank-chambers, Halifax.

MARCH 17.—**Welshpool.**—FOUR SEMI-DETACHED VILLAS AT SALOP-ROAD, WELSHPOOL.—For Mr. Wm. Humphreys, Egremont, Welshpool. Plans, etc., may be inspected, on written application to Mr. R. W. Davies, architect and surveyor, Dolafon, Carno.

* MARCH 23.—**Chingford.**—SCHOOLS.—The Epping L.A. Sub-Committee of the Essex Education Committee invite tenders for schools, caretaker's house, latrines, etc., in New-road, Chingford. For further particulars refer to an advertisement in this issue.

MARCH 23.—**Killarney.**—CHURCH EXTENSION.—The completion of the tower and spire, extension of nave and aisles, additions and alterations to Sacristy and new mortuary chapel at St. Mary's Cathedral, Killarney Co Kerry for the Most Rev. Dr. Mangan, Lord Bishop of Kerry. Bills of quantities have been prepared for the work by Mr. D. W. Morris, surveyor, 68, Harcourt-street, Dublin, and can be had from him on payment of 2*l.* 2s. The plans

can be seen at the offices of Messrs. Ashlin & Coleman, architects, 7, Dawson-street, Dublin.

* MARCH 26.—**London.**—DWELLINGS.—The St. Pancras B.C. invite tenders for erection of dwellings for the working class, Gray's Inn-road, W.C. For further particulars see advertisement in this issue.

* MARCH 30.—**St. Helens.**—SCHOOLS.—The St. Helens B.C. invite tenders for new schools in Sutton, St. Helens. For further particulars refer to an advertisement in this issue.

NO DATE.—**Ballyclare.**—MANSE.—The Committee of Second Ballyeaston Presbyterian Church invite tenders for building a manse, etc., near Ballyclare. Drawings, etc., may be seen, and further particulars obtained, at office of Mr. N. Fitzsimons, F.R.I.B.A., architect, 13, Lombard-street, Belfast.

NO DATE.—**Barrow-in-Furness.**—WALL.—The Corporation invite tenders for the construction of about 666 lin. yds. of boundary wall, abutting upon the New Ferry-road and Bridge Approach. Bills of quantities, etc., may now be obtained upon application at the Borough Engineer's office.

NO DATE.—**Leeds.**—PREMISES.—The erection of premises, Elland-road, Leeds, for Messrs. Kraft & Hornung. Names and addresses to offices of Mr. G. Fredk. Bowman, architect, 5, Greek-street, Leeds.

NO DATE.—**Rawtenstall.**—NEW PIGGERIES.—Tenders are invited for carrying out the work in connexion with the erection of new piggeries on the Union Farm at Higher Pike Law, Rawtenstall. Specifications, etc, may be had on application to Mr. J. H. Sinkinson, Clerk to the Guardians, Union Offices, Higher Pike Law, Rawtenstall.

NO DATE.—**Silloth.**—ALTERATIONS TO FARM BUILDINGS.—Alterations and repairs to farm buildings, Dryholme, Silloth. Names to Mr. George Armstrong, architect and surveyor, 24, Bank-street, Carlisle.

ENGINEERING, IRON, AND STEEL.

MARCH 1-5.—**Neath.**—LOCK AND HARBOUR WORKS.—The Neath Harbour Commissioners invite tenders for the removal of the partly constructed ship lock and other works in Neath River, near Briton Ferry. Plans, etc., may be seen at the Harbour Offices, Briton Ferry, and copies of the same, with form of tender, may be obtained, on payment of 2*l.* 2s.

MARCH 2.—**Edinburgh.**—HOT-WATER WORKS.—Edinburgh P.C. invite tenders for the removal of an existing cast-iron water tank and the supplying and fitting up of a new hot-water installation, to the baths in South-East Dormitory block, Craigleith Poorhouse, Comely Bank. Specifications, etc., to be had from Mr. R. M. Cameron, 53, Great King-street, Edinburgh, Architect to the Council.

MARCH 3.—**London.**—RAILS, ETC.—The South Indian Railway Company, Ltd., invite tenders for the supply of:—(1) Steel rails (50 lb.) and fishplates, about 425 tons; (2) tie-bars, gibs, and cotters, about 42 tons, etc. Specifications etc., may be obtained at the Company's offices, 55, Gracechurch-street, London, E.C.

MARCH 4.—**King's Lynn.**—TIMBER QUAY.—King's Lynn Conservancy Board invite tenders for the construction of a timber quay at the South Quay, King's Lynn. Plans, etc., prepared by Mr. E. J. Silcock, M.Inst.C.E., Sanctuary House, Westminster, the Board's Engineer, can be seen on application at the office of Mr. W. D. Ward, solicitor, Clerk to the Board, King's Lynn.

MARCH 5.—**Cardiff.**—REPAIRS, ETC., TO PUMPING STATION.—The Corporation of Cardiff invite tenders for new steam pipes, repairs, and alterations, Cogan Pumping Station. Specifications may be seen, and particulars obtained, from the Waterworks Engineer, Mr. C. H. Priestley, M.Inst.C.E., City Hall, Cardiff.

MARCH 6.—**Ballinasloe.**—STEAM-COOKING APPARATUS.—The Joint Committee of Management of the Lunatic Asylum invite tenders for the supply and erection of a steam-cooking plant, in accordance with the plans and specifications prepared by their Engineer, Mr. G. B. Meenan, 5, Charleville-road, Rathmines, Dublin, from whom copies may be obtained on payment of 1*l.* 1s.

MARCH 7.—**Elgin.**—GASHOLDER.—Elgin T.C. invite tenders for excavation work and concrete foundation for a gasholder to be erected at North Lodge, Elgin. The Gas Manager will point out the work, and specifications can be seen at his office.

MARCH 7.—**Sunderland.**—BOILER.—The Corporation of Sunderland invite tenders for the supplying and fixing at Hallgarth-square Baths and Washhouses, Sunderland, one single-flued Cornish boiler, 22 ft. by 6 ft., 80-lb. pressure. Specifications, etc., may be obtained at the Borough Engineer's office, Town Hall, Sunderland.

MARCH 9.—**Cleckheaton.**—RETORTS.—The U.D.C. of Cleckheaton invites tenders for the supply and erection of three through stacks of retorts on the Hudson generative principle, and also for the building of a dwarf chimney. Plans, etc., may be seen upon application to the Gas Engineer, at his office at the Town Hall, during usual office hours.

MARCH 9.—**Manchester.**—TRAMWAY POINTS.—Manchester Corporation Tramways Committee invite tenders for the supply of permanent-way points, tongues, and Hardened-steel centres. Specifications, etc., may be obtained on application to Mr. J. M. M'Elroy, General Manager, Tramways Department, 55, Piccadilly, Manchester, on deposit of 1*l.* 1s. Drawings may be inspected at the Engineer's office, 55, Piccadilly, Manchester, on production of the specification.

MARCH 9.—**Slough.**—COOKING APPARATUS.—Eton Guardians invite schemes for renewing the cooking apparatus at their Workhouse, at Slough. Full particulars of requirements may be had from the Workhouse Master.

MARCH 10.—**Thornbush, Inverness.**—EMBANKING, ETC.—Estimates are wanted for about 2,800 cubic yds. excavation and the same amount of embanking, about 8,500 cubic ft. of timber work, and laying rails of slipway, to be constructed at Thornbush, Inverness. Drawings, etc., will be shown, and schedules of quantities supplied, by Mr. James Fraser, Civil Engineer, Inverness.

MARCH 20.—**Bury.**—VALVES, ETC.—The Bury and District Joint Water Board invite tenders for the supply of valves, hydrants, and other fittings for 8-in. pipe, Edenfield to Haslingden. Copies of the specification, etc., may be obtained at the office of the engineer, Mr. J. Cartwright, 21, Parson's-lane, Bury, on deposit of 10s.

MARCH 21.—**Hull.**—GALLERIES.—Hull Corporation invite designs and tenders for three new ferro-concrete galleries, having a total area of about 1,100 sq. yds., at the Cattle Market, Edward's-place. Forms of tender and other particulars may be obtained at the City Engineer's office. Prints of the plans will be supplied on payment of 5s., not returnable. Remittances should be made payable to Mr. T. G. Milner, City Treasurer.

MARCH 26.—**Chatham.**—WEIGHBRIDGE.—Chatham T.C. invite tenders for the supply and erection of a public weighbridge. Full particulars can be obtained on application at the Borough Surveyor's office, Town Hall, Chatham.

MISCELLANEOUS.

MARCH 2.—**Abram.**—SCAVENGING.—Abram U.D.C. invite tenders for the emptying of ashpits and removal of nightsoil. Further particulars may be obtained on application to the Surveyor, Mr. W. H. Roby, Council Offices, Abram.

MARCH 2.—**Bishop's Stortford.**—FIRE-ENGINE.—The U.D.C. invite tenders for the supply and delivery of a steam fire-engine, capable of throwing from 260-300 gallons per minute. Firms tendering are requested to quote prices for (1) a motor steam fire-engine, and (2) a horse-drawn engine. Mr. Thos. Swatheridge, Clerk of the Council, Council Offices, Offices, 7, North-street, Bishop's Stortford.

MARCH 2.—**Luton.**—ROAD ROLLER.—Luton Corporation invite tenders for the supply of a 6½-ton single-cylinder steam road roller. Any further information that may be required can be obtained from Mr. S. F. L. Fox, Borough Engineer.

MARCH 2.—**Norwich.**—MOTOR WAGON, ETC.—The Executive Committee of the Norwich Corporation invite tenders for the supply and delivery f.o.r. Norwich of a motor wagon and fittings. Specification, etc., may be obtained on application at office of Mr. Arthur E. Collins, M.Inst.C.E., City Engineer, etc., Guildhall, Norwich.

MARCH 3.—**Sunderland.**—SCAVENGING.—Sunderland R.D.C. invite tenders for the periodical removal and deposit of all ashes, nightsoil, and house refuse, etc., from dwelling-houses. Forms of tender may be obtained on application to Mr. J. C. Wilson, Clerk to the Council, 17, John-street, Sunderland.

MARCH 3.—**Watford.**—SCAVENGING.—Watford R.D.C. invite tenders for scavenging works. Specifications, etc., may be obtained on application to Mr. John Robinson, Inspector of Nuisances, at the Offices of the Council, 9, Market-street, Watford.

MARCH 4.—**Cheam.**—SCAVENGING.—Cheam P.C. invite tenders for removal of house refuse and the emptying and cleansing of ashpits within the Parish of Cheam. Mr. Jas. Ockenden, Clerk to the Council, High-street, Cheam.

MARCH 4.—**Newport, Salop.**—NAME PLATES.—The U.D.C. invite tenders for supply and fixing of about fifty name plates. Pattern may be inspected at the Council Offices. Mr. J. S. Underhill, Clerk to the Council.

MARCH 5.—**Cambridge.**—CARTING.—Cambs. C.C. invite tenders for carting materials on to the several sections of the Cambridgeshire main roads. For forms, etc., apply to Mr. John Papworth, Landbeach, Cambs., Assistant Surveyor for the Western Side; or to Mr. E. S. Whaley, Cherryhinton-road, Cambridge, Assistant Surveyor for the Eastern Side.

MARCH 5.—**Kingston-upon-Thames.**—MARKET STALLS.—Tenders are invited for the erection, removal, and repair of the stalls, etc., for the Wednesday's, Thursday's, and Saturday's markets, in accordance with certain conditions, which can be seen at the Municipal Offices.

MARCH 6.—**Atcham.**—CARTAGE.—Atcham R.D.C. invite tenders for cartage of stone and materials. Particulars can be obtained from the surveyor, Mr. T. Fortune, Pontesbury; or from Mr. Joseph Everest, Clerk, D.C. Offices, St. John's Hill, Shrewsbury.

MARCH 6.—**Tinsley.**—ASPHALTING.—The West Riding Education Committee invite tenders for asphalting Tinsley Provided School, near Sheffield. Plans may be seen, and bills of quantities obtained, on application to office of Mr. J. Vickers-Edwards, County Architect, County Hall, Wakefield. A deposit of 1*l.* is required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent to him direct, at the County Hall, Wakefield.

MARCH 7.—**Bredwardine.**—HAULING.—The R.D.C. invite tenders for hauling stone and gravel. Forms of tender may be had from Mr. Hamar, Bricklands, Hay, the Council's Surveyor.

MARCH 7.—**Holborn.**—LIGHTING.—Holborn B.C. invite tenders for the lighting, extinguishing, and general maintenance of public lamps, and for the supply of gasfitters' work, etc. Forms of contract may be seen, and forms of tender, etc., obtained, at office of Mr. Lionel Walford, Town Clerk, Council Offices, No. 197, High Holborn, W.C.

MARCH 9.—**Middleton.**—DISINFECTING POWDER.—The Corporation of Middleton (Sanitary Department) invite tenders for disinfecting powder. Further particulars and form of tender may be obtained from Mr. C. H. Norton, Sanitary Inspector, Corporation-street, Middleton.

MARCH 9.—**Wimborne.**—TEAM, ETC., LABOUR.—Wimborne and Cranborne R.D.C. invite tenders for quarrying, sifting, breaking, and yarding gravel to pass a 2-in. ring gauge, and for team work connected therewith. Forms of tenders, etc., can be had on application at the office of the Clerk to the Council, or at the office of Mr. R. T. S. Seymour, District Surveyor, Wimborne Minster.

MARCH 10.—**Faversham.**—CARTING.—Faversham R.D.C. invite tenders at per day of nine working hours for all team labour required for one year. Form of tender, etc., to be obtained of the District Surveyor, Mr. J. G. Chittenden, Ashford-road, Faversham.

MARCH 11.—**Newbury.**—TEAM LABOUR.—The R.D.C. invite tenders for cartage and team labour. Further particulars, etc., can be obtained on application to Mr. E. H. Horncastle, Highway Surveyor, 2, Edinburgh-terrace.

MARCH 12.—**Monaghan.**—WATER-CLOSET BASINS.—Monaghan District Asylum Joint Committee invite tenders for supplying fifteen water-closet basins, according to patterns, which may be seen at Asylum. Mr. T. Gallagher, Acting Clerk of Asylum.

MARCH 16.—**Sedgefield.**—CARTING.—Sedgefield R.D.C. invite tenders for the leading of road materials. Forms of tender, etc., may be obtained on application to Mr. T. Griffiths-Roberts, surveyor, Sedgefield, Ferryhill.

MARCH 21.—**Lancashire.**—SCHOOL SUPPLIES.—Lancashire Education Committee invite tenders for the supply of furniture (except school desks and pianos) for the County Elementary Schools. Tenders may be submitted for any one or more of the thirty-five local area districts. Particulars and conditions may be obtained from Dr. Snape, Director of Education, County Offices, Preston. Letters must be endorsed "Tenders."

MARCH 25.—**Romford.**—SCAVENGING.—Romford R.D.C. invite tenders for the removal and disposal of contents of earth closets for one year. Specifications may be seen and full particulars obtained from the Council's Offices.

NO DATE.—**Bangor.**—LIFTING MOORINGS.—The lifting and examining moorings of Training Ship *Clio*. Apply Capt. Superintendent, *Clio*, Bangor, N.W.

NO DATE.—**Barrow-in-Furness.**—FENCING.—The Corporation invite tenders for the supply and erection of about 770 lin. yds. of racecourse fencing in New Ferry-road. Further particulars may now be obtained upon application at the Borough Engineer's office.

NO DATE.—**Cynghordy.**—REMOVAL OF BOILER.—For removal of a boiler, weighing 20 tons, from railway company's siding at Cynghordy, near Llandovery, to site of new brickworks. Messrs. Wm. Johnson & Sons, Castleton Foundry, Leeds.

PAINTING, etc.

MARCH 4.—**Leeds.**—PAINTING, ETC.—Leeds Corporation invite tenders for cleaning down, painting, etc., the various police-stations in the city of Leeds. Forms of tender, etc., may be obtained at the City Engineer's Office, Municipal Buildings, Leeds, on payment of a deposit of 1*l.* 1s.

MARCH 4.—**Team Valley, etc.**—PAINTING.—North-Eastern Railway Directors invite tenders for painting the Station Buildings, etc. Specifications, etc., may be obtained on application to Mr. Charles A. Harrison, engineer, Forth Banks, Newcastle-on-Tyne.

MARCH 9.—**Barrow-in-Furness.**—PAINTING, ETC.—The Corporation invite tenders for cleaning, painting, etc., the external wood and ironwork at the Central, Anson-street, and Roose Police-stations. Form of tender, etc., can be obtained upon application at the Borough Engineer's Office, Town Hall.

MARCH 10.—**Bournemouth.**—PAINTING.—The Bournemouth T.C. invite tenders for painting, etc., at the chapels at Wimborne-road Cemetery. Full particulars, etc., can be obtained of Mr. F. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1*l.* 1s. has been previously deposited.

MARCH 10.—**Southend-on-Sea, etc.**—PAINTING.—The Standing Joint Committee of the Court of Quarter Sessions and C.C. invite tenders for painting and other work at Police-station, Southend, and police quarters, Westcliffe-on-Sea. Specifications can be seen at the Police-station, Alexandra-street, Southend-on-Sea, and at police quarters, Westcliffe-on-Sea.

MARCH 11.—**Watford.**—PLUMBERS' JOINTS.—Watford U.D.C. invite tenders for plumbers' wiped joints on lead pipes for their Water Supply Department. Specification, etc., can be inspected at the office of the Engineer and Surveyor to the Council, 14, High-street, Watford.

NO DATE.—**Barrow-in-Furness.**—BATH, ETC.—The Corporation invite tenders for the installation of a bath, together with plumber's work, at Devonshire-road Hospital. Further particulars may now be obtained upon application at the Borough Engineer's office, Town Hall.

NO DATE.—**Shipley.**—PLUMBERS' WORK.—The plumbers', glaziers' work required in the erection of twelve houses, Marlborough-road, Shipley. Apply Mr. W. Baxter, 36, Scarboro'-road, Shipley.

ROADS, SANITARY, AND WATER WORKS.

MARCH 2.—**Kendal.**—SEWAGE WORKS.—The Corporation invite tenders for the construction of two additional septic tanks and providing and laying 12-in. and 18-in. stoneware pipes at the Sewage-Disposal Works. Drawings, etc., may be seen, and bills of quantities obtained, on application at the office of Mr. F. W. Oxberry, Borough Engineer and Surveyor, Kendal.

MARCH 2.—**Perth.**—SEWER.—The Perth T.C. invite tenders for the laying of a new main sewer, 24-in. diameter, along Gray-street, and proposed streets in Pickeltillum Estate to Viewlands-road. Plan, etc., can be seen, and schedules of quantities obtained, at the offices of Mr. R. M'Killop, Borough Surveyor, 16, Tay-street, Perth.

MARCH 2.—**Whitley Bay.**—STREET WORKS.—Whitley and Monkseaton U.D.C. invite tenders by schedule of prices for forming and completing cement footpaths, kerbing, channelling, and tar macadam new streets on the Whitley Links Estate, Whitley Bay. Plans, etc., may be seen, and forms of tender obtained, on application to Mr. John Moore, Surveyor, at his office, Council Buildings, Whitley Bay, R.S.O.

MARCH 4.—**Musselburgh.**—LAYING PIPES.—The T.C. of Musselburgh invite tenders for providing and laying about one mile of 6-in. cast-iron pipes within the Burgh from Newhailes-road to Inveresk Brae. Drawings may be seen, and copies of schedules, etc., obtained, from Mr. G. Somervel Carfrae, C.E., 1, Erskine-place, Edinburgh.

MARCH 4.—**Thames Ditton.**—MAKING-UP.—The U.D.C. of Esher and the Dittons invite tenders for making-up Weston Park, Thames Ditton, about 1,043 ft. run, including laying surface-water drain, kerbing, asphalt paving, and other works. Plans, etc., may be seen at office of Mr. E. A. Everett,

Clerk, Council Offices, Brabant Villa, Thames Ditton, upon payment of a deposit of 10s.

MARCH 6.—**Wimbledon.**—SEWER.—Wimbledon Corporation invite tenders for the relaying of a portion of the middle level sewer. Plans, etc., may be inspected, and form of tender obtained, on application at the Borough Engineer and Surveyor's offices, Town Hall, Broadway, Wimbledon.

MARCH 7.—**Eston.**—ASPHALTING.—The Eston and Normanby Burial Board invite tenders for asphalting about 1,300 yds. of walks in their cemetery. Specifications to be seen at the Cemetery Lodge.

MARCH 7.—**Grantown-on-Spey.**—WATER WORKS.—The T.C. of Grantown-on-Spey invite tenders for the construction of new water works, comprising collecting works, a 52,000-gallon reservoir, about 3¾ miles of 7-in. diameter, and ¾ mile of 5-in. to 2-in. cast-iron piping and tracks, etc. Plans, etc., may be seen with, and schedules of quantities obtained from, Mr. James Gilbert, Engineer for the Works, Grantown-on-Spey; or Messrs. Geo. Gordon & Co., C.E., Inverness, on deposit of 1*l.* 1s.

MARCH 7.—**Silloth.**—LAYING MAINS.—Holme Cultram U.D.C. invite tenders for laying water mains from Silloth to Skinburness. Schedules, etc., at office of Mr. George Armstrong, engineer, 24, Bank-street, Carlisle.

MARCH 9.—**Derby.**—WATER SUPPLY TO SPONDON.—Derby Corporation Waterworks Committee invite tenders for carting, laying, and jointing cast-iron mains from Mansfield-road, near St. Mary's Goods Station, in the Borough of Derby, and terminating in the Parish of Spondon. Plans, etc., may be seen, and printed specification, etc., obtained, at the offices of Mr. John Ward, M.Inst.C.E., Borough Surveyor, Borough Surveyor's Office, Babington-lane, Derby, on deposit of 1*l.* 1s.

‡ MARCH 9.—**Devizes.**—NEW SEWER.—The Devizes U.D.C. invite tenders for a new sewer, manholes, etc., to serve the Forty Acres District. For further particulars see advertisement in this issue.

MARCH 9.—**Leatherhead.**—ROAD WORKS, ETC.—The U.D.C. of Leatherhead invite tenders for: No. 1, Oxshott-road (construction of 250 yds. lin. of 9-in. stoneware pipe sewer); No. 2, High-street, North-street, and Bridge-street (construction of subsidiary sewers and drains); No. 3, St. John's-avenue (making-up); No. 4, construction of mortuary. The drawings and form of contract may be seen, and specification, etc., obtained, at the office of Mr. J. E. Smales, Surveyor, Council Offices, Leatherhead, upon payment of a deposit of 1*l.* 1s. for each contract.

MARCH 9.—**Rutherglen, Glasgow.**—SEWERS.—Rutherglen Joint Sewer Committee invite tenders for the construction of about 2,530 lin. yds. of egg-shaped brick sewers. Plans, etc., may be seen at the office of the engineers, Messrs. Warren & Stuart, C.E., 94, Hope-street, Glasgow, from whom forms of tender, etc., may be obtained on payment of 1*l.* 1s. An assistant engineer will meet intending offerers at Shawfield Toll, Rutherglen, on March 3, at 11 a.m.

MARCH 11.—**Barnet.**—MAKING-UP.—Barnet U.D.C. invite tenders for the making-up of Elm and Orchard roads. Plans, etc., can be seen, and all information obtained, on application to Mr. W. F. Wilkins, Surveyor to the Council, No. 40, High-street, Barnet.

MARCH 11.—**Gravesend.**—WOOD-BLOCK PAVING.—The T.C. of Gravesend invite tenders for the supply and laying of about 1,300 yds. super. of Canadian spruce blocks. Plan, etc., may be seen at the Borough Surveyor's office, Town Hall, Gravesend.

MARCH 13.—**Tamworth.**—SEWERS.—Tamworth R.D.C. invite tenders for the construction of about ten miles of 15-in., 12-in., and 9-in. pipe sewers in the parishes of Wilnecote, Bolehall, and Glascote, in the county of Warwick, and the Parish of Fazeley, in the county of Stafford. Plans, etc., may be seen, and quantities obtained, at the office of Mr. Henry J. Clarson, engineer, 22, Church-street, Tamworth, on deposit of the sum of 2*l.*

MARCH 16.—**Catford.**—ROAD IMPROVEMENTS.—Lewisham B.C. invite tenders for kerbing, channelling, and metalling the roadways and paving the footpaths with artificial stone (in separate contracts) of Thornsbeach-road, Catford. The plans, etc., may be seen, and forms of tender obtained, at the Town Hall, Catford (Surveyor's Department). Copies of the specification may also be had on payment of the sum of 5s. in each case.

* MARCH 16.—**St. Albans.**—SEWERAGE.—The Corporation of St. Albans invite tenders for four storm-water filter-beds, etc. For further particulars see advertisement in this issue.

MARCH 21.—**Formby.**—STREET WORKS.—Formby U.D.C. invite tenders for private street improvements, Victoria-road and Barkfield-lane. Plans, etc., may be seen, and bills of quantities obtained, on application to the Surveyor, Mr. A. W. Pattison, at the Council Offices, Formby.

NO DATE.—**Barry.**—ROADS, ETC.—The formation of new road, sewers, etc., on the Buttrills Estate, Barry. Names to Mr. Henry Bodgen, F.R.I.B.A., 95, St. Mary-street, Cardiff, with cheque for 2*l.* 2s.

STONE, MATERIALS, AND STORES.

MARCH 2.—**Barrow-in-Furness.**—STORES.—The Corporation invite tenders for the supply of oils, engine-room stores, tools, ironmongery, etc.; electrical stores, required at the Electricity Works during the year ending March 31, 1909. Forms of tender may be obtained, and samples of materials, etc., may be seen, on application to the Borough Electrical Engineer, at the Electricity Works.

MARCH 2.—**Croydon.**—TIMBER.—Croydon Guardians invite tenders for the supply of 50 fathoms of good, sound yellow deal ends and battens, at per fathom. Forms of tender can be obtained at office of Mr. Harry List, Clerk to the Guardians, Union Offices, Mayday-road, Thornton Heath, Surrey.

MARCH 3.—**Belfast.**—SUPPLIES.—Belfast District Asylum Committee of Management invite tenders for supplying the Institution with paints and oils, plumbing materials, timber. Official forms to be had on application to the Clerk, at the office of the Institution, Grosvenor-road, Belfast.

MARCH 3.—**Failsworth.**—MATERIALS.—The U.D.C. of Failsworth invite tenders for the supply of materials and stores. Form of tender, etc., may be obtained at the office of Mr. G. F. Gray, Surveyor to the Council.

MARCH 3.—**London.**—GOODS WAGONS, ETC.—The Secretary of State for India in Council invites tenders for the supply of:—(1) Covered goods wagons; (2) wheels and axles; (3) locomotives. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

MARCH 3.—**Smallburgh.**—ROAD MATERIALS.—Smallburgh R.D.C. invite tenders for the supply of road materials. Further particulars, etc., may be obtained on application to the District Surveyor, Mr. W. L. Lewis, Stalham.

MARCH 4.—**Barnsley.**—WATER PIPES.—The Water Committee invite tenders for about 25 tons of 3-in. and 4-in. metal socketed water pipes, and about 8 tons of special castings. For particulars apply to Mr. J. Henry Taylor, M.Inst.C.E., Waterworks Manager, Manor House Offices, Barnsley.

MARCH 4.—**Barrow-in-Furness.**—MATERIALS.—The Corporation invite tenders for the supply of stores and materials. Forms of tender, etc., may be obtained on application at the Borough Engineer's office, Town Hall.

MARCH 4.—**Birmingham.**—STORES.—Birmingham Corporation invite tenders for supply of slack, iron and steel ware, belting, timber, brushes, drysaltery, and miscellaneous stores. Specifications, etc., may be obtained on application to the Superintendent, Montague-street Wharf.

MARCH 4.—**Hendon.**—ANNUAL CONTRACTS.—The R.D.C. of Hendon invite tenders for the supply of materials, etc., and the execution of works. Further particulars and form of tender may be obtained on application to the Surveyor, Mr. J. A. Webb, Great Stanmore, to whom samples of granite and gravel must be sent.

MARCH 4.—**Kirkintilloch.**—ROAD METAL.—Whinstone metal for roads in the parishes of West Kilpatrick, East Kilpatrick, Kirkintilloch, and Cumbernauld. Copies of the specification may be procured from the Clerk, Mr. Hugh Hutcheson, at his office, 115, Wellington-street, Glasgow; or the Surveyor, Mr. Archibald Wilson, at his office, County Buildings, Dunbarton.

MARCH 4.—**Rhondda.**—MATERIALS.—Rhondda U.D.C. invite tenders for the supply of lime, oxide of iron, fire-bricks, wrought-iron tubes, gas, water, and gun-metal fittings, gas meters, oils and paints, etc. Forms of tender may be obtained on application to Mr. Octavius Thomas Engineer and Manager, Gas and Water Offices, Pentre Rhondda, Glam.

MARCH 5.—**Birmingham.**—STORES.—For stores to be supplied to the Corporation Gasworks in Birmingham and Swan village, and the Wednesbury branch offices. Conditions, etc., price 5s. each, of Mr. G. Hampton Barber, Secretary, City Gas Offices, Council House.

MARCH 5.—**Huddersfield.**—MATERIALS.—The Corporation of Huddersfield invite tenders for the supply and delivery of materials. Specifications, etc., may be obtained on application at the offices of Mr. K. F. Campbell, M.Inst.C.E., M.I.E.E., Borough Engineer and Surveyor, 1, Peel-street.

MARCH 5.—**Smethwick.**—STORES.—The Corporation of Smethwick invite tenders for the supply of materials and articles for the year ending March 31, 1909. Forms of tender may be obtained from Mr. C. J. Fox Allin, Borough Surveyor, Council House, Smethwick.

MARCH 5.—**Southend-on-Sea.**—STORES.—The Corporation invite tenders for the supply of articles. Forms of tender may be obtained upon application to Mr. E. J. Elford, M.I.M.E., Borough Surveyor, Southend-on-Sea.

MARCH 5.—**Withnell.**—PIPES, ETC.—Withnell U.D.C. invite tenders for the supply of stoneware pipes and gulleys, limestone, granite, macadam, and kerbs and setts. Forms of tender may be obtained from the Surveyor to the Council, Mr. T. Moss, Council Offices, School-lane, Brinscall.

MARCH 6.—**Market Harborough.**—GRANITE.—Market Harborough R.D.C. invite tenders for supply of granite; estimated quantity, about 5,000 tons of X, XX, and XXX, broken. Mr. W. H. Blount, Surveyor, Laughton, Rugby.

MARCH 6.—**Merton.**—MATERIALS.—Merton U.D.C. invite tenders for materials, etc. Forms of tender, etc., can be obtained on application to Mr. C. J. Mountifield, Clerk of the Council, D.C. Offices, Kingston-road, Merton, Surrey.

MARCH 7.—**Clown.**—SLAG.—Clown R.D.C. invite tenders for the supply of the best broken slag for roads. Forms of tender, etc., may be obtained of Mr. J. T. Pears, surveyor, Hollin Hill, Clown, near Chesterfield.

MARCH 7.—**Droitwich.**—STONE.—Droitwich Corporation invite tenders for the supply of Rowley rag. Forms of tender may be obtained from Mr. Hy. Hulse, Borough Surveyor.

MARCH 7.—**Eccles.**—STORES.—For scavengers' brooms, refil rotary brushes, shovels, ashbins, colza oil, etc. Particulars, etc., may be obtained from Mr. C. W. Laskey, Town Hall, Eccles.

MARCH 7.—**Hale.**—CONCRETE FLAGS.—Hale U.D.C. invite tenders for the supply and laying complete of approximately 1,400 super. yds. of concrete flags, 2½ in. thick. Further particulars, etc., will be forwarded upon the receipt of a stamped addressed envelope. Mr. S. A. Pickering, Surveyor, Council Offices, Hale, Cheshire.

MARCH 7.—**Hale.**—SUPPLIES.—Hale U.D.C. invite tenders for the supply of granite macadam, limestone, kerbs, channels, etc. Forms of tenders will be forwarded on receipt of a stamped addressed envelope. Mr. S. A. Pickering, Surveyor, Council Offices, Hale, Cheshire.

MARCH 7.—**Haslingden.**—MATERIALS.—The T.C. invite tenders for materials, etc. Further particulars, etc., may be had on application to Mr. J. Singleton Green, Borough Surveyor, on receipt of a prepaid addressed foolscap envelope.

MARCH 7.—**Kiveton Park.**—SLAG.—Kiveton Park R.D.C. invite tenders for the supply of the best broken slag for roads. Forms of tender, etc., may be obtained of Mr. J. P. Evans, Surveyor, Council Offices, Kiveton Park, near Sheffield.

MARCH 7.—**Padiham.**—MATERIALS.—Padiham U.D.C. invite tenders for the supply of materials for one year. Printed forms of tender, etc., containing full particulars, may be obtained upon application to Mr. Gregson, A.M.Inst.C.E., Town Hall, Padiham.

MARCH 7.—**Riccall.**—ROAD MATERIAL.—Riccall R.D.C. invite tenders for the supply of materials for the repair of the roads. Forms of tender may be obtained from Mr. E. Townend, Clerk, Council Offices, 1, Abbey-place, Selby.

MARCH 7.—**Wetherby.**—ROAD MATERIAL.—Wetherby R.D.C. invite tenders for broken whinstone, blue stone, granite, and dross; also tar macadam. Marked samples to be sent to Mr. Wiseman, Wetherby, Surveyor to the Council.

MARCH 9.—**Blyth.**—SLAG.—Blyth and Cuckney R.D.C. invite tenders for the supply of the best broken slag for roads. Forms of tender, etc., may be obtained of Mr. Frederick Hopkinson, surveyor, 66, Bridge-street, Worksop, Notts.

MARCH 9.—**Lichfield.**—GRANITE, ETC.—Lichfield R.D.C. invite tenders for granite and slag. Further particulars and forms of tender may be obtained upon application to Mr. C. O. Rawstron, District Surveyor, Lichfield.

MARCH 9.—**Lichfield.**—TOOLS, ETC.—Lichfield R.D.C. invite tenders for carting, tools, oil, etc. Forms of tender may be had on application to Mr. C. O. Rawstron, District Surveyor, Lichfield

MARCH 9.—**London.**—MATERIALS, ETC.—Westminster City Council invite tenders for the execution of works and the supply of materials, articles, etc. Specifications, etc., may be obtained on application at the Town Clerk's office, Westminster City Hall, Charing Cross-road, W.C.

MARCH 9.—**Nuneaton.**—ANNUAL CONTRACTS.—Tenders are invited for the supply of materials during twelve months. Conditions of contract and forms of tender may be obtained on application at office of Mr. F. C. Cook, Borough Surveyor, Municipal Offices, Nuneaton.

MARCH 9.—**Wokingham.**—OIL.—The R.D.C. of Wokingham invite tenders for the supply and delivery of oil. Forms of tender, giving further particulars, will be sent on application. Mr. John F. Sargeant, Clerk, Council Offices, Wokingham.

MARCH 9.—**Yardley.**—SUPPLIES.—Yardley R.D.C. invite tenders for the supply of materials, etc., for a period of twelve months. Particulars, etc., may be obtained on application to Mr. Arthur W. Smith, Engineer and Surveyor, Council House, Sparkhill, near Birmingham.

MARCH 10.—**Cardiff.**—TIMBER.—Cardiff Education Committee invite tenders for the supply of timber for manual instruction. Tender forms, etc., may be obtained from the Director of Education, City Hall, Cardiff.

MARCH 10.—**Faversham.**—GRANITE.—Faversham R.D.C. invite tenders for the supply and delivery of 1,550 tons of best Guernsey granite, Rhenish basalt, or Cornish syenite broken to a 2-in. gauge. Form of tender, etc., can be had on application to the District Surveyor, Mr. J. G. Chittenden, Ashford-road, Faversham.

MARCH 10.—**Faversham.**—ROAD MATERIALS.—Faversham R.D.C. invite tenders for the supply of pit flints (broken), shingle, and fine gravel. Full particulars, etc., may be had on application to Mr. J. G. Chittenden, District Surveyor, Ashford-road, Faversham.

MARCH 10.—**Leeds.**—MATERIALS.—Leeds Sanitary Committee invite tenders for materials, etc. Further particulars and forms of tender may be obtained on application to Mr. J. J. Mann, Superintendent, Dock-street Depôt.

MARCH 10.—**Long Ashton.**—ROAD MATERIALS, ETC.—Long Ashton R.D.C. invite tenders for:—(1) Hauling stones; (2) hire of horses, carts, and drivers; (3) for quarrying and breaking stones; (4) supply of the best mountain limestone. Specifications, etc., may be seen, and particulars, on application to Mr. James Hawkins, District Surveyor, Brockley, near Bristol.

MARCH 10.—**Taunton.**—FLINTS.—The Guardians invite tenders for the supply of 300 (or 400) yds. of the best flints. Mr. W. F. B. Dawe, Clerk to Guardians, Taunton.

MARCH 10.—**Thornton.**—CAST-IRON PIPES.—Thornton (Lancashire) U.D.C. invite tenders for 400 to 500 tons of 3-in., 4-in., 6-in., and 9-in. cast-iron spigot and socket pipes. Copies of specification, etc., may be had on application to Mr. H. Fenton, Surveyor, Council Offices, Thornton.

MARCH 11.—**Edinburgh.**—WORKS AND SUPPLIES.—Edinburgh Corporation invite tenders for works and supplies for one year from May 15 next. Forms of offer may be obtained at the Public Health Office, 321, High-street.

MARCH 11.—**Fulham.**—ANNUAL CONTRACTS.—The Fulham B.C. invite tenders for materials. Forms, etc., from Mr. J. Percy Shuter, Town Clerk, Town Hall, Fulham, S.W.

MARCH 11.—**Portobello, Edinburgh.**—ANNUAL CONTRACTS.—Tenders are invited for works, etc. Schedules, etc., may be had at the office of the City Superintendent of Works, City-chambers, Edinburgh.

MARCH 11.—**Tutbury.**—ROAD MATERIALS, ETC.—Tutbury R.D.C. invite tenders for road material and cartage. Printed forms of tender may be obtained from Mr. C. F. Chamberlin, Clerk, Council's Offices, Union Offices, Burton-upon-Trent, or from Mr. H. S. Tebbitt, Surveyor, Rolleston, Burton-on-Trent.

MARCH 11.—**Twickenham.**—CONTRACTS.—Twickenham U.D.C. invite tenders for shingle granite kerb, channel, and quadrants, etc. Forms of tender, etc., may be obtained on application to Mr. F. W. Pearce, F.S.I., Surveyor to the Council, Town Hall, Twickenham.

MARCH 11.—**Uckfield.**—MATERIALS.—Uckfield R.D.C. invite tenders for the supply of broken granite, broken Kentish ragstone, etc. Particulars, etc., may be obtained from Mr. Frederick Holman, Clerk to the Uckfield R.D.C., 86, High-street, Lewes; or from Mr. E. W. Ray-Johnson, Surveyor of Highways, Buxted, Uckfield.

MARCH 11.—**Wood Green.**—ANNUAL TENDERS.—The U.D.C. invite tenders for the supply and execution of materials, works, etc. Forms of tender, etc., may be obtained at office of Mr. Wm. P. Harding, Clerk of the Council and Local Education Authority, Town Hall, Wood Green.

MARCH 12.—**Dartford.**—ROAD MATERIALS.—The R.D.C. of Dartford invite tenders for the supply of materials, and for the maintenance and repair and the steam rolling of the district roads. Forms of tender, etc., can be obtained upon application to the Surveyor, Mr. John Hookins, Gartly, Dartford.

MARCH 12.—**Eastbourne.**—ROAD MATERIALS, ETC.—Eastbourne R.D.C. invite tenders for stone, flints, and cartage. Forms of tender may be obtained from Mr. T. E. Varley Kirtlan, Clerk to the Council, 92, Terminus-road, Eastbourne; or Mr. C. M. Carter, Down View, Polegate, on forwarding stamped addressed foolscap envelope.

MARCH 12.—**Newcastle-upon-Tyne.**—SUPPLY OF MATERIAL, STORES, ETC.—The Town Improvement and Streets Committee invite tenders for the supply of materials. Forms of tender may be obtained on application at the City Engineer's office, Town Hall.

MARCH 12.—**Sedgefield.**—STONE.—The R.D.C. of Sedgefield invite tenders for the supply and delivery of Whinstone, limestone, and slag. Specification and forms of tender may be obtained on application to Mr. T. Griffiths-Roberts, Highway Surveyor, Sedgefield, Ferryhill.

MARCH 13-17-18.—**Bournemouth.**—STORES.—The Bournemouth T.C. invite tenders for horse hire, supply of tools, supply of fine gravel, etc. Mason, paviours', and drainage works. Full particulars and forms of tender may be obtained on application to the Borough Surveyor (Mr. F. W. Lacey).

MARCH 14.—**Burnley.**—MATERIALS.—The Highways and Sewage Committee invite tenders for the supply of materials. Specifications, etc., may be obtained on application at the office of Mr. G. H. Pickles, M.Inst.C.E., Borough Engineer, Town Hall, Burnley.

MARCH 14.—**Hunslet.**—ROAD MATERIALS.—Hunslet R.D.C. invite tenders for granite, limestone, dross, flags, setts, and kerbs. Specification, etc., may be obtained on application from Mr. W. B. Pindar, Clerk, Council Offices, Glasshouse-street, Hunslet, Leeds.

MARCH 14.—**Rotherham.**—ROAD MATERIALS, ETC.—Rotherham R.D.C. invite tenders for the supply of granite and slag; also for the team labour necessary. Specifications, etc., may be obtained from Mr. R. Bradbury, District Surveyor, 29a High-street, Rotherham.

MARCH 14.—**Westhoughton.**—MATERIALS.—The U.D.C. invite tenders for the supply of materials and stores. Form of tender may be obtained on application to Mr. Thomas Partington, Clerk to the Council, Town Hall, Westhoughton.

MARCH 16.—**Eastry.**—STORES.—Eastry Guardians invite tenders for articles required at the Union Workhouse, Eastry, where printed forms of tender may be obtained.

MARCH 16.—**Margate.**—MATERIALS, ETC.—The supply of:—Schedule No. 1—cast-iron pipes and special castings; No. 2—valves, hydrants, fittings, and surface boxes; No. 3—wrought-iron and steel tubing and fittings; No. 4—yellow metal fittings; No. 6—lead, spun yarn, and rubber insertion. Applications for schedules and forms of tender should be made to the Manager, Mr. F. Stanley, 18, Cecil-square, Margate.

MARCH 16.—**Newark.**—ROAD MATERIAL.—The R.D.C. of Newark invite tenders for the supply of about 850 tons of granite and 2,250 tons of slag. Further particulars may be obtained upon application to the District Surveyor, Mr. R. Oakden, jun., Winchilsea-avenue, Newark.

MARCH 16.—**Sevenoaks.**—MATERIALS, ETC.—Sevenoaks R.D.C. invite tender for materials, team labour, steam rolling, etc., in connexion with the repair of highways. Specifications, etc., may be obtained on application at office of Mr. George F. Carnell, Clerk of the Council, Sevenoaks; or from Mr. R. Bailey, Sundridge, Sevenoaks; and Mr. W. H. Bolt, Mill Hill, Edenbridge, Kent, Surveyors to the Council.

MARCH 16.—**Tenterden.**—ROAD MATERIALS.—Tenterden R.D.C. invite tenders for the supply of quartzite, basalt, or other approved macadam picked flints, and Kent ragstone. The carriage of the above. Further particulars and forms of tender may be obtained of Mr. W. L. C. Turner, District Surveyor, Tenterden, to whom samples should be sent.

MARCH 17.—**Sutton Coldfield.**—ANNUAL CONTRACTS.—The Corporation invite tenders for the supply of materials. Conditions of contract and forms of tender may be obtained on application to Mr. W. A. H. Clarry, Borough Engineer and Surveyor, The Council House, Sutton Coldfield.

MARCH 18.—**Hoo.**—MATERIALS.—Hoo R.D.C. invite tenders for materials, etc. Printed forms of tender may be obtained of Mr. Richard Phillott-Smyth, Clerk, Strood.

MARCH 18.—**Margate.**—STORES.—The supply of articles. Forms of tender and particulars as to samples, etc., can be obtained on application at the Borough Surveyor's Office, Town Hall, Margate.

MARCH 18.—**Sutton.**—MATERIALS.—Sutton (Surrey) U.D.C. invite tenders for the supply of materials. Conditions of contract and forms of tender may be obtained on application to Mr. C. Chambers Smith, Engineer and Surveyor to the Council, Municipal Offices, Sutton, Surrey, on forwarding a stamped addressed envelope.

MARCH 18.—**Walsall.**—MATERIALS.—The R.D.C. of Walsall invite tenders for the supply of materials. Forms of tender may be obtained at the office of Mr. W. P. Young, District Surveyor, Council Offices, Rushall, Walsall.

MARCH 24.—**South Shields.**—MATERIALS.—The R.D.C. of South Shields invite tenders for materials. Specifications and forms of tender may be had on application to Mr. Thos. T. Bains, C.E., Surveyor, at the Council's Offices.

MARCH 24.—**Wembley.**—SUPPLIES.—Wembley U.D.C. invite tenders for the supply of materials for the year. Forms of tenders, etc., can be obtained from Mr. Fredk. W. Rodd, Clerk to the Council, by forwarding a stamped addressed foolscap envelope.

MARCH 31.—**Magor and St. Mellon's.**—ROAD MATERIAL.—The Magor and St. Mellon's R.D.C. invite tenders for the supply and delivery of broken limestone and gravel. Specifications, etc., may be obtained upon application at offices of Mr. Ithel Thomas, Clerk, Union Offices, Queen's Hill, Newport, Mon.

NO DATE.—**Abingdon.**—ROAD STONE.—The Abingdon R.D.C. invites tenders for the supply of about 3,000 tons of road stone. Forms of tender can be obtained of Messrs. B. & E. M. Challenor, Clerks to the Council, The Council's Offices, 59, Stert-street, Abingdon.

NO DATE.—**Ipswich.**—ROAD MATERIAL.—East Suffolk C.C. invite tenders for supplying broken granite, quartzite, and flints. Particulars can be had on application to Mr. H. Miller, M.Inst.C.E., County Surveyor, 16, Museum-street, Ipswich.

NO DATE.—**Staines.**—MATERIALS.—Staines R.D.C. invites tenders for the supply of broken road stone. Particulars and all information may be obtained upon application to the Surveyor to the Council, Mr. Geo. W. Manning, London-road, Stanwell, Staines.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale
*TIMBER, BARNES, S.W.—On the Premises	Neville & Crosse	March 2
*FOREIGN TIMBER—Bentick Dock, King's Lynn	Robert W. Beeve	March 3
*WALL-PAPER MERCHANT'S STOCK—At 21, Hartfield-road, Wimbledon	J. T. Skelding	do.
*LEASE, MACHINERY, STOCK, ETC., OF JOINERY COMPY., SURBITON—On the Premises	Horne & Co.	do.
*BUILDING MATERIALS, TIMBER, ETC., CHESHUNT—On the Premises	J. Tydeman	March 5
*WALL PAPER MERCHANT'S STOCK—At 118, Drummond-street, N.W.	J. T. Skelding	March 6
*TIMBER, MACHINERY, AND PLANT, WISBECH—On the Premises	Maxey & Son	March 9
*TIMBER, ETC., PADDINGTON—On the Premises	Joseph Hibbard & Sons	March 10
*BUILDING MATERIALS, PICCADILLY—On the Premises	Horne & Co.	March 12
*MACHINERY OF SAW-MILLS, ETC., BLACKFRIARS—On the Premises	Joseph Hibbard & Sons	do.
*BUILDING MATERIALS, MACHINERY AND EFFECTS, SLEAFORD—On the Premises	Longstaff & Wadsley	March 13
*BUILDER'S STOCK, MAIDA VALE—On the Premises	Joseph Hibbard & Sons	March 16
*TIMBER STOCK, SHOREDITCH—On the Premises	Joseph Hibbard & Sons	March 17
*FREEHOLD BUSINESS PREMISES, CITY—At the Mart	Green & Son	March 20
*FREEHOLD ESTATE, NEW SOUTHGATE—At the Mart	Harman Bros.	March 27
*FREEHOLD BUILDING ESTATE, BRENTWOOD—At the Mart	Browett & Taylor	March 31

PATENTS.—*Continued from page 256.*

ends to it, and consists in that by screwing the spindle through the bolt so that it projects from the opposite side to which it enters, and screwing the lever ends towards the centre, it cannot be moved until it is properly adjusted.

8,302 of 1907.—A. E. PICKERSGILL: *Chimney-cowls for Preventing Down Draughts.*

This relates to a chimney-cowl, consisting of the usual casing provided with vertical slots all round, comprising the combination therewith of a cap or hood, and an inflated cone for preventing down draughts and increasing or improving the up draughts.

11,663 of 1907.—F. H. SHORLAND: *Ventilators Used to Admit Fresh Air into the Rooms of Buildings.*

This relates to that type of ventilator used to admit fresh air into the rooms of buildings in which the air inlet is regulated by means of a hinged panel flush or thereabouts with the wall of the room, and consists in providing a stop bar which ordinarily limits the outward movement of the panel. This stop bar is hinged so that it may be turned on its hinges and so permit the panel to be swung entirely downwards, thus providing space ample enough to allow of access to the interior of the ventilator. The means are also provided whereby the hinged panel can be easily removed entirely. To effect this the panel is mounted to turn upon pivot pins at each side of the bottom edge of the panel. One of these pivot pins is a fixture, but the other is made telescopic within the panel, and a projecting knob or the like permits the pivot to be withdrawn within the panel to enable the panel to be removed, or to protrude the pivot pin out of the panel into its socket when the panel has been replaced in position in the frame of the ventilator.

11,936 of 1907.—W. MONKS: *Chimney-pots.*

This relates to a chimney terminal or chimney-pot, constructed of separate sections, each section having a socket to receive the edge of the section above it, and having in one of its sides an air inlet with an inclined side or louvre.

17,977 of 1907.—L. MONNOYER, A. MONNOYER-ROMMELAERE, and M. MONNOYER: *Construction of Chimneys.*

This relates to a chimney constructed of reinforced concrete and formed of superposed sections, each of which is constituted by blocks provided at one extremity with a recessed salient protuberance intended for embracing one of the rods of the vertical framework of the chimney, to fit over the other extremity of the adjacent block, and to form between the two adjacent blocks and around the reinforcing rod a groove, which is filled with concrete.

22,071 of 1907.—J. ROOM: *Water-waste Preventer.*

This relates to a water-waste preventer, and comprises a cylinder, a piston working therein, a spring, a discharge pipe, and a service pipe, a flap operated by a rod and a catch device. To fill the cylinder the handle or rod is turned so as to bring the flap over the discharge pipe and off the service pipe. The water then enters the cylinder and forces up the piston, thereby compressing the spring. When the piston reaches nearly to the top of the cylinder, it releases the catch by means of a chain leading from the piston to said catch, thus freeing the flap, which, by means of a spring, is caused to cover the service pipe and to open the discharge pipe. The spring then forces down the piston, thereby emptying the cylinder, which latter remains empty until the flap is again turned to uncover the service pipe.

22,693 of 1907.—F. VOLLMER: *Iron Beams with Corrugated Webs.*

This relates to an iron beam with a corrugated web, characterised in that the corrugations extend directly beneath the flanges, whilst solid strengthening pieces of the full width of the corrugations may be provided immediately below the flange so as to support the flanges as much as the webs are corrugated.

23,431 of 1907.—A. SPENCER: *Traversing Jacks.*

This relates to portable traversing jacks of the kind, comprising a base-plate or bed in which is mounted to rotate a traversing screw extending longitudinal of the base-plate or bed and a vertically extending standard that carries a lifting screw and which can be moved along the base-plate or bed by rotation of the traversing screw, which engages a nut fixed to or formed in one with the standard, and consists in the jack standard being so arranged to engage the base that relative vertical movement between the two is prevented, and comprising a jack base, end bearings thereon, in which the traversing screw is mounted to rotate, and a jack standard, a nut engaging the screw and formed with a shank which is fixed in a hole in the lower end of the standard. The side walls of the base are each formed with an inwardly extending horizontal flange that constitutes a guideway for the jack standard. For the purpose of preventing the standard from moving vertically relatively to the base the lower end thereof is formed at each side with hook-like downwardly and outwardly

extending web that closely engages the corresponding flange for a considerable length thereof, so that whilst the standard is free to slide upon the base it cannot rise relatively thereto. Consequently the traversing screw cannot be bent by relative movement between the base and standard, and the nut, being incapable of any movement other than an endwise movement, serves as an effective bearing for supporting the screw between its ends, and thereby in effecting stiffening of such screw.

23,445 of 1907.—E. LOWY: *Handles for Tools and the like.*

This relates to a wooden handle or haft for tools and the like with longitudinal slots in the part receiving the tang characterised by the fact that three slots are provided at equal angles to each other adapted to hold the tool with the requisite elasticity, but without a division which extends right across the handle, and thus weakens the latter and renders it liable to break.

24,000 of 1907.—H. GOLDSCHMIDT and K. GOLDSCHMIDT: *Clamping Tool for Holding and Butting Rail-ends, Beams, and the like during Welding.*

This relates to a clamping tool for holding and butting rail-ends, beams, and the like during welding, comprising two or more pairs of clamping jaws, each jaw pair being provided with outer inclined surfaces and fitting into the hollow frustrums of a pyramidal hollow in the central portion of a clamp body surrounding the jaws in such a manner that in drawing the clamp bodies towards one another by suitable means the jaws are first tightly pressed against each of the pieces to be clamped, and said pieces are then moved bodily towards each other, each jaw pair being provided with faces to suit the profile of the pieces to be welded and the clamping jaws having their larger bases opposed.

24,704 of 1907.—E. STECKEL: *Seat-guards for Water-closets.*

This relates to a seat-guard for water-closets, comprising a series of paper strips interconnected by links of filament and adapted to be wound off a roll, with a hook adjacent to the said roll adapted to engage the link between the ultimate and penultimate strips, a spring-pressed guide roll adapted to depress and stretch the ultimate strip drawn over the seat, and a stud or the like adapted to engage the link at the free end of said ultimate strip, the guard strip being of a width exceeding the distance between the seat aperture and front edge of the seat, with a line of flexion parallel with one end of said guard strip, and a line of flexion approximately conforming to the curvature of the aperture and with incisions terminating at said curved line of flexion.

25,366 of 1907.—S. J. CHINN: *Stays for Windows.*

This relates to stays for windows, and is in part also applicable to fanlights, comprising a fast-threaded rod working through a nut attached to one end of a tube. The tube is furnished with a socket having means for pivoting between two lugs of an attachment plate. The rod is further provided with a Whitworth thread or other thread of much smaller pitch than the main part of the rod. This thread is oppositely threaded to the main thread, and works in a threaded pivoting block. The end of the rod is provided with a band wheel or other means for readily rotating it. A few turns of the wheel causes the casement to rapidly open, the rod coming out of the sheathing tube. It is practically impossible for the casement to run back on its thread, owing to the opposite threading of the rod and to the small pitch of the screw. An attachment is provided for the purpose of enabling a cord to be run on to the stay when at a height which is inconvenient for operation by hand. The attachment can be slipped on to the extended boss of the wheel, and arms serve for retaining a cord round the wheel, while a base provides a guide through which the cord can be taken.

7,759 of 1907.—H. CARTER: *Composition for Treating Pipe Coverings.*

This relates to a composition for treating covers which are placed or wound around pipes for preventing the attacks of rust, and also to prevent freezing in frosty weather. The composition is prepared by heating the ingredients in a suitable vessel. The ingredients when heated should be well stirred and of the consistency of thick syrup, so as to permeate the sacking or canvas used as a covering, and also to be suitable when cold for application to the pipes by means of a brush or otherwise. A suitable proportion for the composition is:—Gas tar, 25 per cent.; boiled oil, 25 per cent.; resin, 50 per cent. The covering is treated by steeping the composition preferably when hot, so that it may be thoroughly impregnated with the liquid.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

February 13.—By DOWELLS (at Edinburgh).

Jedburgh, Roxburgh.—The Royal Hotel £2,310

February 17.—By ARTHUR ALDRIDGE & CO.

Streatham.—Perrybout Cottage, f., y.r. 36*l.* 8*s.* 420

East Wickham, Kent.—Green Man Cottages, f.g.r. 40*l.*, reversion in 50 yrs. 870

1 and 2 and 5, 6, 7, and 8, Caroline Cottages, f., w.r. 96*l.* 800

By F. K. DEBENHAM.

Barnes.—Lonsdale-rd., f. g. rents 40*l.*, reversion in 44 yrs. 985

Finsbury Park.—Chatterton-rd., f.g. rents 15*l.*, reversion in 66 yrs. 340

Holloway.—Hartham-rd., l.g. rents 50*l.* 8*s.*, u.t. 48¼ yrs., g.r. 4*l.* 760

Hartham-rd., l.g. rents 42*l.*, u.t. 48¼ yrs., g.r. 3*l.* 625

Chelsea.—13 Cheltenham-ter., u.t. 32 yrs., g.r. 7*l.*, y.r. 40*l.* 505

73, Limerston-st., u.t. 36¼ yrs., g.r. 7*l.*, y.r. 45*l.* 300

Battersea.—79, Lavender-hill, u.t. 63¼ yrs., g.r. 7*l.* 10*s.*, y.r. 40*l.* 345

By JONES, LANG, & CO.

Cheapside.—No. 72, f., a. 866 ft., y.r. 1,000*l.* .. 24,000

February 18.—By R. BURR & SONS.

Paddington.—2, Westbourne Park-villas, f., p. 860

By RUTLEY, SON, & VINE.

Regent's Park.—160 and 162, Albany-st., and 27 and 28, Little Edward-st., u.t. 29 yrs., g.r. 24*l.*, y.r. 316*l.* 15*s.* 1,160

Holloway.—152, Hornsey-rd. (s.), and 81, Tollington-rd., u.t. 35 yrs., g.r. 5*l.*, y.r. 114*l.* .. 835

St. Pancras.—36, Ampthill-sq., u.t. 36 yrs., g.r. 12*l.*, p. 675

February 19.—By ED. HUGH HENRY.

Blackfriars.—18, Charlotte-st. (s.), f., y.r. 82*l.*... 1,200

By CHARLES MUSKETT.

Beckenham.—223 and 225, Birkbeck-rd., f., e.r. 93*l.* 12*s.* 525

By JOSEPH STOWER.

Thornton Heath.—High-st., f.g. rents 32*l.*, reversion in 59 yrs. 940

Grange Park-rd., f.g. rents 40*l.*, reversion in 59 yrs. 800

West Thurrock, Essex.—Amelia-pl., etc., f.g. rents 30*l.*, reversion in 67 yrs. 500

By GEO. TROLLOPE & SONS.

Chelsea.—12, Cheyne-gdns., u.t. 55¼ yrs., g.r. 11*l.*, y.r. 120*l.* 1,300

February 20.—By H. J. BLISS & SONS.

Bethnal Green.—20, Patriot-sq., f., w.r. 26*l.* .. 440

71, Three Colt-la., f., w.r. 66*l.* 6*s.* 450

18, Derbyshire-st., f., w.r. 36*l.* 8*s.* 310

By CARTWRIGHT & ETCHES.

Tooting.—Crowborough-rd., f.g. rents 36*l.*, reversion in 98 yrs. 810

By HENRY HOLMES & CO.

Camden Town.—1, 3, 5, Rochester-pl., u.t. 31¼ yrs., g.r. 4*l.* 10*s.*, y.r. 114*l.* 1,060

Eltham.—10, The Parade (s.), u.t. 891 yrs., g.r. 8*l.*, e.r. 48*l.* 475

By NEWBON, SHEPHARD, & EDWARDS.

Bermondsey.—98, Tower Bridge-rd., u.t. 12 yrs., g.r. 4*l.*, y.r. 90*l.* 120

Kensington.—134, Portobello-rd., u.t. 35¼ yrs., g.r. 8*l.* 8*s.*, y.r. 55*l.* 250

132, Portobello-rd. (s.), u.t. 35¼ yrs., g.r. 9*l.*, y.r. 55*l.* 340

Crayford, Kent.—High-st. (s.), "The Prince of Wales," f., p. 160

Merton, Surrey.—Abbey-rd. (s.), "Uncle Tom's Cabin," f., p. 200

Highbury.—52, Northolme-rd., u.t. 80 yrs., g.r. 7*l.*, e.r. 50*l.* 420

By STIMSON & SONS.

Shepherd's Bush-rd.—No. 97, u.t. 76¼ yrs., g.r. 10*s.*, e.r. 55*l.* 400

Notting-hill.—122, Clarendon-rd., u.t. 35¼ yrs., g.r. 12*l.*, y.r. 48*l.* 200

Clapton.—47, Cricketfield-rd., u.t. 49¼ yrs., g.r. 7*l.* 7*s.*, y.r. 36*l.* 300

Fulham.—1, 3, and 7, Hugon-rd., u.t. 70¼ yrs., g.r. 12*l.*, w.r. 117*l.* 710

Tooting.—Longley-rd., freehold site 480

Battersea Park-road.—No. 77, f., y.r. 112*l.* 10*s.* 700

By GRIMLEY & SON (at Birmingham).

Harborne, Staffs.—23, 25, and 27, Nursery-rd., f., w.r. 41*l.* 12*s.* 450

Minworth, Warwick.—Kingsbury-rd., "Railway Inn," f., p. 400

By ALFRD SPAIN & SON (at Gravesend).

Gravesend, Kent.—15, Wrotham-rd., f., y.r. 30*l.* 300

9, Woodville-ter., f., y.r. 40*l.* 420

80, Windmill-st., f., e.r. 25*l.* 300

By TOOTALL & GREEN (at Maidstone).

Linton, Kent.—Seven cottages and two enclosures of land, 1 acre, f., w.r. 57*l.* 16*s.* 845

February 21.—By JOHN BOTT & SONS.

Norwood.—6, 7, 8, and 9, East-st., and 1 to 14, East-pl., u.t. 2, 14¼, and 28 yrs., g.r. 17*l.* 8*s.*, w.r. 's 258*l.* 14*s.* 700

Herne Hill.—176, Railton-rd., u.t. 58 yrs., g.r. 6*l.* 10*s.*, p. 360

By CHARLES VARLEY.

Leytonstone.—68, Old Fillebrook-rd., f., e.r. 45*l.* 550

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

FRIDAY, FEBRUARY 28.

Incorporated Association of Municipal and County Engineers.—Metropolitan District Meeting, to be held at the Caxton Hall (Room 13), Westminster. Discussion on the following papers: (1) "Construction of Public Baths," by Mr. T. W. Aldwinckle, F.R.I.B.A.; (2) "Continuous Filtration of Bath Water," by Mr. R. J. Angel, M.Inst.C.E., Borough Engineer, Bermondsey." 7 p.m.

Glasgow Architectural Craftsmen's Society.—Mr. A. T. Heathcote on "The Architectural Criticisms of Ruskin." 8 p.m.

Royal Society of Arts (Shaw Lecture on Industrial Hygiene).—Dr. John Scott Haldane, M.A., M.D., M.R.C.P. (Edin.), F.R.S., on "The Removal of Dust and Fumes in Factories." 8 p.m.

SATURDAY, FEBRUARY 29.

Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, King's Hall, Holborn Restaurant, 6 p.m.

Royal Institution.—Mr. Selwyn Brinton, M.A., on "The Art of Florence."—III. 3 p.m.

Institute of Sanitary Engineers.—Visit to Southwark Refuse Disposal Works, Manor-place, Walworth-road.

MONDAY, MARCH 2.

Royal Institute of British Architects.—A special general meeting to elect the Royal Gold Medallist for the current year. The Chairman to move—That, subject to His Majesty's gracious sanction, the Royal Gold Medal for the Promotion of Architecture be presented this year to M. Honoré Daumet, Member of the Institute of France. The ninth general meeting (business) of the Session will then be held to proceed with the Election of Candidates for Membership under By-laws 7, 8, and 9. Mr. Herbert W. Wills has given notice that he will move, and that Mr. A. W. S. Cross will second, the following resolutions:—1. That for all competitions for buildings of 15,000*l.* and upwards a jury of three Assessors be appointed. 2. That the fees paid to such Assessors be the same in total amount as the fee hitherto paid to one Assessor. 8 p.m.

Liverpool Architectural Society.—Sir. C. Nicholson, Bart., M.A., on "Modern Church Building," illustrated. 6 p.m.

University of London (South Kensington).—Mr. Banister Fletcher on "The English Mediæval House." 8 p.m.

Society of Engineers.—Mr. A. J. Metcalfe, M.S.E., on "The Treatment and Formation of Roads." 7.30 p.m.

TUESDAY, MARCH 3.

Civil and Mechanical Engineers' Society.—Mr. A. S. E. Ackermann, B.Sc. (Eng.), A.M.I.C.E., on "Engineering Works in Austria and Bosnia." 8 p.m.

Institution of Civil Engineers.—Paper to be further discussed: "The New York Rapid-Transit Subway," by Mr. W. Barclay Parsons, M.Inst.C.E. 8 p.m.

WEDNESDAY, MARCH 4.

Edinburgh Architectural Association.—Mr. Stephen Adams, F.S.A.Scot., on "Progress of Stained Glass Art in Scotland, with Personal Reminiscences," lantern slides. 8 p.m.

Royal Archæological Institute.—Mr. Albert Hartshorne, F.S.A., on "Holdenby Manor, Church and House," illustrated with plans and drawings. 4.30 p.m.

THURSDAY, MARCH 5.

Carpenters' Hall, London Wall.—Mr. Banister F. Fletcher on "Georgian Architecture." 8 p.m.

Institution of Electrical Engineers.—Professor A. Schwartz and Mr. W. H. N. James on "Fuse Phenomena." 8 p.m.

London Institution.—Mr. F. Hovenden, F.L.S., F.G.S., on "A Study of the Principles of Nature."—I. 5 p.m.

FRIDAY, MARCH 6.

Architectural Association.—Mr. P. L. Forbes on "Water-colour Drawing for Architects." 7.30 p.m.

Royal Institution.—Professor J. Milne on "Recent Earthquakes." 9 p.m.

Institution of Civil Engineers (Students' Meeting).—Papers to be read: (1) "Surveying on Thunder Bay Branch of the Grand Trunk Pacific Railway, Canada," by Mr. R. V. Morris; (2) "British Practice in Railway Surveying," by Mr. W. Graham; (3) "Railway Surveying in Great Britain," by Mr. W. C. Crawford. 8 p.m.

SATURDAY, MARCH 7.

Royal Institution.—Professor J. J. Thomson, M.A., LL.D., D.Sc., on "Electric Discharges through Gases."—I. 3 p.m.

Edinburgh Architectural Association.—Visit to Scottish National Exhibition Buildings.

TO CORRESPONDENTS.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 6 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 5 0	" " "
Picked Stocks for Facings	2 10 0	" delivered.
Flettons	1 5 6	" at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	12 0 0	" " "
Headers	11 0 0	" " "
Quoins, Bullnose, and Flats	16 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	6 6	per yard, delivered.
Thames Ballast	5 0	" "
Best Portland Cement	30 0	per ton, "
Best Ground Blue Lias Lime	19 6	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 2	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "
YORK STONE—*Robin Hood Quality.*		
Scappled random blocks	2 10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	per ft. cube, "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—		
Scappled random blocks	3 0	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 " "	13 17 6	" "
20×10 first quality	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. "
Best Broseley tiles	50 0	per 1000 "
Do. Ornamental tiles	52 6	" "
Hip and Valley tiles	4 0	per doz. "
Best Ruabon red, brown, or brindled do. (Edward's)	57 6	per 1000 "
Do. Ornamental do.	60 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 0	" "
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 "
Do. Ornamental do.	54 6	" "
Hip tiles	4 1	per doz. "
Valley tiles	3 8	" "
Best "Rosemary" brand plain tiles	48 0	per 1000 "
Best Ornamental tiles	50 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 8	" "
Best "Hartshill" brand plain tiles, sand-faced	50 0	per 1000 "
Do. pressed	47 6	" "
Do. Ornamental do.	50 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 6	" "

WOOD.

BUILDING WOOD.	At per standard. £ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	...	15 0 0
Deals: best 3 by 9	13 0 0	...	14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	...	12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0		less than 7 in and 8 in.
Deals: seconds	1 0 0		less than best.
Battens: seconds	0 10 0	"	"
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	...	10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	...	9 10 0
Foreign Sawn Boards—			
1 in. and 1¼ in. by 7 in.	0 10 0		more than battens.
¾ in.	1 0 0		"
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	...	5 0 0
Seconds	4 0 0	...	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	...	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	...	3 10 0
Swedish balks	2 10 0	...	3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	...	4 15 0

JOINERS' WOOD.	At per standard. £ s. d.		£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	...	25 0 0
3 in. by 9 in.	22 0 0	...	23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	...	18 0 0
Second yellow deals, 3 in. by 11 in.	18 10 0	...	20 0 0
" " 3 in. by 9 in.	17 10 0	...	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	...	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	...	15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	...	12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	...	22 10 0
Do. 3 in. by 9 in.	18 0 0	...	19 10 0
Battens	13 10 0	...	15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	...	17 0 0
Do. 3 in. by 9 in.	14 10 0	...	16 0 0
Battens	11 0 0	...	12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	...	14 0 0
Do. 3 in. by 9 in	12 10 0	...	14 0 0
Battens	10 0 0	...	11 0 0
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	14 10 0	...	15 10 0
" " 3 in. by 9 in	13 10 0	...	14 10 0
Battens	11 0 0	...	12 0 0
Second white deals, 3in. by 11 in.	13 10 0	...	14 10 0
" " 3 in. by 9 in.	12 10 0	...	13 10 0
" " battens	10 0 0	...	11 0 0
Pitch-pine: deals	18 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow pine—First, regular sizes	44 0 0		upwards.
Oddments	32 0 0		"
Seconds, regular sizes	33 0 0		"
Yellow Pine oddments	28 0 0		"
Kauri Pine—Planks, per ft. cube	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	...	0 3 6
Small " "	0 2 6	...	0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	...	0 0 9½
¾ in. do. do.	0 0 7	...	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	...	0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	17 0 0	...	22 0 0
American Whitewood Planks, per ft. cube	0 4 0	...	0 5 0

WOOD (*continued*).

JOINERS' WOOD (*continued*)— Prepared Flooring, etc.—	Per square. £ s. d.		£ s. d.
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. " "	0 14 0	...	0 18 0
¾ in. by 7 in. white " "	0 10 0	...	0 11 6
1 in. by 7 in. " "	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 10 0	...	8 0 0
Compound Girders, ordinary sections	9 10 0	...	10 10 0
Steel Compound Stanchions	12 0 0	...	13 0 0
Angles, Tees, and Channels, ordinary sections	9 10 0	...	10 10 0
Flitch Plates	9 10 0	...	10 10 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	...	0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0
Staffordshire Crown Bars, good merchant quality	8 15 0	...	9 5 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 5 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" " Galvanised	17 0 0	...	—
(*And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	9 15 0	...	—
" " 24 g.	10 15 0	...	—
" " 26 g.	12 5 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	15 10 0	...	—
" " 26 g.	16 10 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	18 0 0	...	—
" " 22 g. and 24 g.	18 10 0	...	—
" " 26 g.	20 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 10 0	...	—
" " 22 g. and 24 g.	14 15 0	...	—
" " 26 g.	16 5 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	13 0 0	...	—
" " " 26 g.	15 0 0	...	—
Cut Nails, 3 in. to 6 in.	10 10 0	...	11 0 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up.	17 5 0	...	—
Pipe in coils	17 15 0	...	—
Soil pipe	20 5 0	...	—
Compo pipe	21 5 0	...	—
ZINC—Sheet—			
Vieille Montague ton	28 10 0	...	—
Silesian	28 5 0	...	—
COPPER—			
Strong Sheet per lb.	0 1 1	...	—
Thin "	0 1 2	...	—
Copper nails "	0 0 11	...	—
Copper wire "	0 0 10	...	—
BRASS—			
Strong Sheet "	0 1 0	...	—
Thin "	0 1 1	...	—
TIN—English Ingots "	0 1 4	...	—
SOLDER—Plumbers' "	0 0 7	...	—
Tinmen's "	0 0 9	...	—
Blowpipe "	0 0 11	...	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d.	per ft. delivered.
" fourths	1¾d.	" "
21 oz. thirds	3¼d.	" "
" fourths	2¼d.	" "
26 oz thirds	4¼d.	" "
" fourths	3¼d.	" "
32 oz., thirds	5d.	" "
" fourths	4¼d.	" "
Fluted Sheet, 15 oz.	3¼d.	" "
" 21 oz.	4¼d.	" "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2¾d.	per ft. delivered.
⅜ "	2¾d.	" "
½ "	3d.	" "
Figured and Oxford Rolled "Oceanic" Glass, white	4d.	" "
Do. " tinted	5¼d.	" "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 2 1
" " " in barrels	"	0 2 2
" " " in drums	"	0 2 3
Boiled " in pipes	"	0 2 2
" " " in barrels	"	0 2 3
" " " in drums	"	0 2 4
Turpentine in barrels	"	0 3 3
" in drums	"	0 3 5
Genuine Ground English White Lead	per ton	22 10 0
Red Lead, Dry	"	22 0 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barre	1 12 0

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDARE.—For building forty houses on Cwmdare-road, for the Windsor Building Club. Mr. Alec. S. Cameron, architect, 1, Glanant-street, Aberdare:—

C. Jenkins & Son	£250 0 0
	290 0 0
J. Lewis	237 0 0
	263 0 0
	229 0 0
T. W. & J. Jenkins	249 0 0
	217 10 0
Davies & Co.	247 10 0
	205 0 0
A. R. John	225 0 0
	200 5 0
R. Lloyd	220 5 0
	199 5 0
D. Rees	225 10 0
	194 0 0
J. H. James	224 0 0
	192 0 0
H. Edwards	219 10 0
	192 0 0
Jones Bros.	214 10 0
	190 15 0
D. T. Davies, Treeynon, Aberdare*	216 12 0
	189 15 0
L. Davies	207 0 0
	185 15 4
W. Brown	227 13 10

[There will be two kinds of houses:—(1) 22 ft. 6 in. by 17 ft. (three bedrooms); (2) 22 ft. 6 in. by 18 ft. (four bedrooms).]

BECKENHAM.—For making-up Clock House-road (south end), for the Urban District Council. Mr. J. A. Angell, Surveyor, Beckenham:—

Fry Bros.	£820	Woodhams & Son	£711
Free & Sons	733	Mowlem & Co., Westminster*	698
W. Pearce	717		

BRIXHAM.—For alterations and additions to Congregational Church, for the trustees. Mr. W. G. Couldrey, architect, Paignton:—

Dart & Francis	£1,197 0 0	Badcock	£815 0 0
Preece	1,053 0 0	S. W. Godfrey	760 0 0
Devonport Joinery Works	997 0 0	G. Cooksley, Brixham*	730 15 6
Yeo & Sons	978 0 0	G. Webber	722 0 0
Wilkin & Sons	934 0 0	H. Webber & Sons	679 0 0
R.E. Wanacott	853 0 0		
Harlewood Bros.	820 0 0		

CLEATOR MOOR (Cumberland).—For building the new St. Patrick's Club. Messrs. Pickering & Crompton, architects, 11, Lowther-street, Whitehaven:—

Joiners,

T. & W. Robinson, Egremont, Cumberland £439*

Rest of Work,

H. S. Dolongham, Bryuff, Cumberland .. 1,295*

CLEETHORPES (Lincs).—For street works, Haigh-street, for Cleethorpes with Thrunscoe Urban District Council. Mr. Egbert Rushton, Engineer and Surveyor, Council House, Cleethorpes:—

H. Heap	£259 12 1	Gooseman & Co., Grimsby*	£225 3 11
G. W. Brown	241 14 8		
H. J. Mason	230 0 0		

[Surveyor's estimate, £230 2 4.]

CROYDON.—For additions and alterations at "Waingates," London-road, for the Guardians. Mr. H. Berney, architect, 104, George-street, Croydon:—

A. Funnell & Co., Pump Pail, Croydon* .. £532

ECCLES.—For heating apparatus, Clarendon-road Council School, for the Corporation. Mr. H. Lord, architect, 42, Deansgate, Manchester. Quantities by architect:—

G. N. Haden & Co., Manchester* £263

EVESHAM.—For alterations and additions to Institute-buildings, Market-place, for the Corporation. Mr. G. H. Hunt, F.R.I.B.A., Bridge-street, Evesham, and Bedford-row, London. Quantities by Mr. R. Griggs, Gray's Inn-square, W.C.:—

W. J. Bloxham	£7,753	Collins & Godfrey	£7,186
J. Barnsley & Sons	7,544	A. Cliff & Co.	7,130
T. Rowbotham	7,490	W. H. Gibbs	6,990
W. Hopkins	7,300	Espley & Co., Evesham*	6,850
J. E. White	7,250	Tilt Bros.	6,799
I. Langley	7,238	J. Dallow & Sons	6,648
J. & A. Brazier	7,200		

HENDON.—For kerbing and paving works, Sunny gardens-road and Nursery-walk, for the Urban District Council. Mr. S. Slater Grimley, Engineer and Surveyor, Council Offices, Hendon:—

W. Griffiths & Co.	£259 1 4
T. Adams	254 5 10
J. Wainwright & Co., Ltd.	250 11 2
J. G. Brummell, 44, Sandringham-road, Willesden Green, W.*	244 6 10

HERNE BAY.—For sewer works, Beaumont-street and other streets, for the Urban District Council. Mr. F. W. J. Palmer, Surveyor, Town Hall, Herne Bay:—

C. E. Killingback & Co.	£1,018 0 0	Hardy & Co.	£585 0 0
P. Furley	865 0 0	W. H. Hill	583 0 0
S. H. Head	667 0 0	Ingleton Bros., High-street, Herne Bay*	547 0 0
J. Mills	632 5 0		

HERTFORD.—For alteration to Bayley Lodge, Queen's-road, for the Trustees of "Nobles Charity":—

J. J. Rayment & Son	£84 0 0	F. A. Vines	£79 18 6
H. Shephard & Co.	77 10 0	R. Ginn & Son	69 0 0
		H. Norris & Son*	68 18 6

HIGH WYCOMBE.—For the erection of new mills, granary, cornstores, etc., Priory-road, for Mr. G. E. Stevens. Messrs. Hooper & Nash, architects, Church-street, High Wycombe, and Gerrard's Cross. Quantities by architects:—

J. Stevens & Son	£1,000	A. W. Morton & Sons	£773
G. Smith	935	C. H. Hunt	753
J. T. Harris	889	G. Nash	748
G. H. Gibson	848	J. Nash & Sons, High Wycombe*	712
H. Flint	793		

HULL.—For heating, ventilating, hot water supply, etc., of Public Hall, shops, etc., for the Property Committee. Mr. J. H. Hirst, City Architect, Town Hall, Hull:—

Haden & Son	£2,907 0 0
Coonan & Johnson	2,890 0 0
Musgrave & Co.	2,350 0 0
Korting Bros.	2,015 0 0
Oldroyd & Co.	1,880 0 0
Matthew & Yates	1,850 0 0
Sheen & Wells	1,779 0 0
Leeds Marble Company	1,679 15 0
Dawson & Co.	1,585 0 0
Brightside Foundry Company	1,560 0 0
A. Green	1,259 15 4
Rosser & Russell, Leeds*	1,148 0 0

LEICESTER.—For alterations and additions at the Branch Library, Garendon-street, for the Corporation. Mr. E. G. Mawbey, M.Inst.C.E., Borough Surveyor, Town Hall, Leicester:—

A. E. Mould	£295 11 0	J. Marston & Son	£228 14 6
W. G. Simons	285 0 0	J. E. Johnson & Sons	228 0 0
W. Haddon	255 0 0	J. Cole	227 11 9
T. D. Brown & Son	245 17 6	J. Hutchinson & Sons	222 11 0
A. & W. Chambers	242 19 1	G. Toone & Sons	213 12 3
Bradshaw Bros.	238 10 0	F. T. Bradford, Leamington-street, Leicester*	203 0 0
Bowles & Son	238 0 0		
Haskald, Rudkin, & Beck	234 0 0		
Foulds Bros.	233 0 0		
Tyers & Yates	230 0 0		
L. Fox	230 0 0		

LEIGH-ON-SEA.—For the first of a series of small bungalows. Mr. Arthur Cole, architect, "Mogok," 34 Thurlestone-road, West Norwood:—

F. J. Green	£440	Spinner & Harris	£280
A. J. & C. Hocking	345		

LONDON.—For the supply of four water-vans, for the Islington Borough Council:—

G. Rowe & Son, Ltd.	£180
W. Glover & Sons, Ltd.	180
T. Baker & Sons	175
Belle Isle Co., Ltd.	172
W. Smith & Son, Barnard Castle*	168
Bristol Waggon & Carriage Co	164
Pallett & Co.	135

LONDON.—For supply of two steam road-rollers, for the Islington Borough Council:—

	10-ton roller and scarifier.	15-ton roller and scarifier.
Aveling & Porter, Ltd., Rochester*	£476 12 6	£591 12 6
Thos. Green & Son, Ltd.	457 10 0	567 10 0

LONDON.—For tarpaving for twelve months, for the Lambeth Borough Council:—

Chatterden & Simmons, for tarpaving, topping, at from 18s. 7d. to 19s. 5d. per cub. yd. according to the ward in which the work is to be done.

Chatterden & Simmons, for tarpaving, bottoming, at 16s. 7d. to 17s. 5d.

LONDON.—For concrete floor, foundations, etc., at Workhouse, Sidney-road, Homerton, N.E., for the Hackney Guardians:—

T. Robinson	£179 0 0	Wilkinson & Co.	£106 0 0
Shurmar & Sons	153 0 0	Weibking & Co.	100 0 0
A. Porter	130 0 0	L. H. & R. Roberts	98 0 0
M. Calnan & Son	128 0 0	J. W. & T. Inkpen	88 0 0
G. Parker	128 0 0	Barrett & Power	57 0 0
R. W. Moore	119 8 0	Dowley, Daniel, & Co.	54 10 1
W. Silk & Son	117 0 0		

LONDON.—For Portland cement and lime, for the Lambeth Borough Council, for twelve months:—

Portland cement.—The tender of Wakeley Bros. & Co. was recommended, but questions were raised as to whether this was Belgium cement, and the matter was held over.

Grey lime.—Wakeley Bros. & Co.

Ground lias lime.—Wakeley Bros. & Co.

LONDON.—Running contracts, for the Lambeth Borough Council:—

Oils and colours.—Grindley & Co., at a discount of 5 per cent. from the Council's schedule rates.

Smiths' work.—A. McQuillin, at 5 per cent. discount on Council's schedule rates.

General ironmongery.—J. Knox & Co., at a premium of 15 per cent. on Council's schedule rates for shovels, and at Council's schedule rates for the other items.

Tools, iron, steel, etc.—J. Knox & Co., at 5 per cent. discount for bar iron, and at schedule for other items.

LONDON.—For granite for twelve months, for the Lambeth Borough Council:—

Brookes, Ltd., for Guernsey broken granite, no stone larger than will pass through a ring two inches in diameter, 1,000 yds., to be delivered within fourteen days, at 12s. 11d. to 15s. 6d. per cub. yd.

Brookes, Ltd., for Guernsey broken granite, no stone larger than will pass through a ring two inches in diameter, 50 yds. to be delivered in 48 hours, at 13s. 2d. to 14s. 6d.

J. Mowlem & Co., ditto, at 15s. 7d.

Brookes, Ltd., for Guernsey granite siftings, at 10s. 2d. to 12s. 7d.

J. Brooke & Son, for new 2½-in. York paving, tooled as described. Quarry measure, at £3 3s. 11d. per 100 ft. super. to £3 4s. 11d.; for new 2½-in. York paving, tooled as described. Quarry measure, at per 100 ft. super, rubbed, at £4 9s. 11d. to £4 10s. 11d.

Hard York Nonslip Stone Co., for 2½-in. "Nonslip" paving, at £3 8s. 3d.

Patent Victoria Stone Co., for 2-in. patent Victoria Stone, at £2 17s. 6d.

Brookes, Ltd., for Norway kerb edge 12 in. by 8 in. at per ft. run, 1s. 6½d. to 1s. 7½d.; Norway kerb edge 12 in. by 8 in. at per ft. run, circular, at 1s. 10½d. to 1s. 11½d.; Norway kerb edge, at per ft. run, flat 8 in. by 8 in., at 1s. 6½d. to 1s. 7½d., Norway kerb edge, 8 in. by 8 in. at per ft. run, circular, at 1s. 10½d. to 1s. 11½d.; Norway kerb edge, at per ft. run, 12 in. by 6 in. flat kerb for channeling, at 1s. 7½d. to 1s. 8½d.

LONDON.—For flints, gravel, and sand, for the Lambeth Borough Council:—

J. & B. Martin, for clean broken flints, at prices ranging from 5s. 5d. to 6s. 5d. per cub. yd. according to the wards in which they are delivered.

W. Hedgecock, for Thames ballast, at prices ranging from 4s. 3d. to 7s. 2d. per cub. yd.

W. Hedgecock, Thames ballast (screened), from 5s. 4d. to 7s. 10d.

Heather, Bailey, & Co., for Thames ballast (crushed ½ in.), at 6s. 1d. to 6s. 10d.; Thames Sand Dredging Co., at 7s. 8d.; and H. Covington & Sons, at 9s.

Thames Sand Dredging Co., for Thames ballast (¼ crushed), at from 6s. 9d. to 7s. 10d.; H. Covington & Sons, at 9s. 6d.

W. Cory & Son, for Thames ballast (½ in. crushed), at 6s. 8d.; H. Covington & Sons, 9s. to 11s. 6d.

W. Hedgecock, for Thames sand, at 5s. 8d. to 7s. 10d.

W. Hedgecock, for Thames sand washed, at 5s. 11d. to 7s. 10d.

J. & B. Martin, for sharp pit sand, at 4s. 11d. to 5s. 3d.

W. Hedgecock, for sharp pit sand washed, at 5s. 11d. to 7s. 10d.

W. Hedgecock, for rough pit gravel, at 5s. 4d.; J. & B. Martin, at 5s. 7d.; and J. Guyatt, at 6s. 3d.

J. & B. Martin, for fine pit gravel for footpaths, at 5s. to 5s. 2d.

J. & B. Martin, for shingle, at 5s. 6d.

A. Pannell, for hardcore from potteries or brick rubbish, at 1s. 10d. to 2s. 11d.

LONDON.—For wood block flooring, for the London County Council. (The Education Committee in order to enable a comparison to be made between the tenders, submitted a statement showing the result of calculations, based on the tenders of the respective contractors, of the cost of the materials and labour in connexion with wood block flooring required for the new school in Sellincourt-road, Wandsworth):—

	12 in. by 3 in. by 1½ in. pitch-pine blocks for the whole contract.	12 in. by 3 in. by 3 in. pitch-pine blocks for the whole contract.	12 in. by 3 in. by 3 in. deal blocks for the whole contract.
	£ s. d.	£ s. d.	£ s. d.
Dovetail Mosaic Co.	443 12 6	698 12 6	692 5 0
Zeta Wood Flooring Co., Ltd.*	444 4 2	635 9 2	527 1 8
Improved Wood Pavement Co., Ltd.	448 18 4	633 15 10	506 5 10
"Excellence" Wood Block Flooring Co.	469 15 0	710 12 6	527 2 6
E. B. Burgess & Co.	474 17 6	895 14 2	633 11 8
Ellis, Geary, & Co.	479 19 5	744 11 1	571 3 7
Geary, Walker, & Co., Ltd.	492 16 0	667 7 6	552 12 6
Westminster Patent Flooring Co.	495 10 0	753 0 0	604 17 6
Acme Flooring and Paving Co. (1904), Ltd.	497 5 0	592 17 6	615 0 0
W. H. Lascelles & Co., Ltd.	504 2 6	813 6 3	729 11 3
Turpin's Parquet Floor, Joinery, and Wood Carving Co.	510 5 0	787 5 0	653 7 6
J. M. Greenhalgh & Co., Ltd.	513 16 8	958 14 2	722 16 8
M. Macleod & Co.	565 18 4	863 0 0	726 12 6

[The tender of the Zeta Wood Flooring Co., Ltd., for providing and laying wood block flooring in Council schools according to a schedule of prices was accepted.]

LONDON.—Annual tenders of the Public Health Committee of the Lambeth Borough Council:—
E. & E. Wright, for sewer castings, at a discount of 5½ per cent. from the Council's schedule rates.
Doulton & Co. and Stiff & Son, for drain pipes, at 15 per cent. discount from Council's schedule rates.
Eastwood & Co., Ltd., for stock bricks, at £1 9s. 9d. per 1,000 bricks delivered in the six inner wards, and £1 13s. 6d. per 1,000 bricks delivered in the three outer wards.

LONDON.—For the construction of an intercepting sewer (the middle-level sewer No. 2) from Old Ford to Paddington, between the northern high-level and the middle-level sewers, for the London County Council:—

G. P. Trentham	£521,169 12 10‡
Perry & Co.	312,167 0 0
E. Bentley & Son	240,518 12 10
S. Pearson & Son, Ltd.	239,041 11 8
W. Manders	237,566 3 1
W. Scott & Middleton, Ltd.	231,935 1 9
W. Kennedy, Ltd.	229,675 2 1
Muirhead & Co.	219,549 10 7
R. H. B. Neal, Ltd.	217,063 11 10
Works Committee's estimate	213,268 17 0
D. R. Paterson, Ltd.	210,589 3 4
Westminster Construction Co., Ltd., Westminster‡	203,417 1 2
Kelletts, Ltd.	199,898 7 2½
G. Hay & Co.	181,468 14 10
J. Moran & Son, Ltd.	172,015 11 11!

‡ Recommended for acceptance.
[The Chief Engineer's estimate, comparable with the tenders, is £215,000. Kelletts, Ltd., submitted an alternative tender of £188,400, if they were allowed to adopt a special method of tunnelling.]

LUTON.—For new shop-front and additions to premises, High Town-road, Luton, for Mr. J. J. Wooding. Mr. H. G. Cole, surveyor, Alexandra-place, Bedford:—

A. Cole	£203 11 0
J. Saunders	190 16 6

PEMBROKE.—For erecting a building to connect the Old Monckton Infants' School and the present mixed school, for Pembroke Education Committee. Mr. K. McAlpin, Borough Surveyor, Pembroke Dock:—

Heatherley & Co.	£172	Davies & Morgan	£141
H. Brown	148		

[All of Pembroke.]

SEAFORD (Sussex).—For cottage at the Sunnyrise Market Garden, for Mr. W. P. Horton. Mr. F. Steward Taylor, A.R.I.B.A., architect, Seaford, and 9, Staple-inn, W.C.:—

T. Funnell	£823 6 6	Godfrey Bros.‡	£730 0 0
W. Wilkinson	750 0 0		

‡ Accepted with some modification.

SOUTHALL.—For erecting 530 lineal yds. of galvanised-iron fencing and gates round Refuse Destructor, etc., site, for Southall-Norwood Urban District Council. Mr. Reginald Brown, Engineer and Surveyor, Public Offices, Southall:—

Brown & Son	£372 5 0	A. J. Main & Co.	£294 0 2
E. Plaistowe	368 9 2	Miller & Son	290 15 0
Drew-Bear, Perks, & Co.	362 15 4	Smith	285 10 0
General Iron Foundry Co.	346 3 4	Ralston, Goodwin, & Co.	284 18 2
F. Smith & Co.	342 16 0	Renbery, Owen, & Co.	282 0 10
Baldwin & Co.	335 0 0	T. W. Palmer & Co.	278 10 4
Rowland Bros.	300 3 4	Bayliss, Jones, & Bayliss	263 18 9
Walker Bros.	298 8 8	J. W. Shellshear	258 10 0
H. S. Tompson	298 5 2	J. Elwell, Birmingham*	241 6 8
Watford Engineering Co.	297 19 2		
The Hurst Iron Works Co.	297 5 0		
Hill & Smith	295 0 4		

[Surveyor's estimate, £300.]

SOUTHALL.—For boiler-house and hot-water heating at the Sanatorium, for Southall-Norwood Urban District Council. Mr. Reginald Brown, Engineer and Surveyor, Public Offices, Southall:—

T. Smith & Co.	£68 5	Abbott & Charlton General Iron Foundry Co.	£43 14 39 0
Cannon & Sons, Ltd.	67 10	R. O. Roberts	34 17
H. C. Clifton	65 0	W. Brown & Son, Southall*	32 17
E. Plaistowe	55 16		
Watkin & Son	50 17		
A. & B. Hanson	44 12		

[Surveyor's estimate, £50.]

STREATHAM.—For a temporary erection to be used as a photographic studio. Mr. Arthur Cole, architect, "Mogok," 34, Thurlestone-road, West Norwood:—

W. Harbrow	£178	A. J. & C. Hocking	£165
Humphreys, Ltd.	177		

SURBITON.—For private street works at Beaconsfield-road, for the Urban District Council. Mr. Henry T. Mather, Surveyor, Council Offices, Surbiton:—

Shepherd & Co.	£1,081 2 0
Kavanagh & Co.	997 0 0
Atkins & Co., Kingston-on-Thames*	881 4 2

SWINDON.—For erecting house and shop in Exmouth-street, for Messrs. T. & J. Arkell. Messrs. Drew & Sons, architects, Regent-circus, Swindon:—

H. W. Pope, Stratton, Swindon*	£435 10

SWINDON.—For the erection of a dwelling-house in Newport-street, for Mrs. Croad. Messrs. Drew & Sons, architects, Regent-circus, Swindon:—

J. Lay, Swindon*	£380

THORPE SATCHVILLE.—For one mile of earthenware and iron sewers, etc., and for sewage disposal works, for Melton Mowbray Rural District Council. Mr. E. Jeeves, Surveyor, Nottingham-street, Melton Mowbray:—

R. C. Crawford	£2,765 18 0	Stimpson & Rollston	£1,789 8 0
Firth & Co.	2,588 18 0	T. Smart	1,785 0 0
Hawley & Son	2,199 18 0	J. & A. Braxier	1,750 0 0
T. Hickman	2,082 0 0	T. H. Harper	1,725 5 0
Ball J. T.	2,032 8 6	H. H. Barry	1,688 0 0
Hutchinson & Son	1,992 0 0	A. Sykes	1,662 14 7
C. Barnes	1,900 0 0	Hardy & Co.	1,650 0 0
W. G. Willmot	1,855 0 0	Johnson & Langley, West Bridge, Leicester	1,600 0 0
J. Chapman	1,850 0 0		
A. Palmer	1,830 0 0		
E. Clarke	1,830 0 0		
T. & H. Denman	1,797 4 0		

TOOTING.—For new laundry premises. Mr. Arthur Cole, architect, "Mogok," 34, Thurlestone-road, West Norwood:—

Uglow Bros.	£630

ULVERSTON.—For widening road, near Tilberthwaite Farm, for the Rural District Council. Mr. F. Y. Molineux, Surveyor, Town Hall, Ulverston:—

Barr & Dixon, Coniston, R.S.O.	£46 15		

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